



## Chapter Seven

### SYSTEM EVALUATION



---

# Chapter Seven

## System Evaluation

Stratification of the airports within the PAG Aviation System, identified in the previous chapter, provides a baseline for evaluating the existing airport System. Within the RASP, performance measures, with specific benchmarks for each measure, are used to evaluate the System. This analysis provides an indication of where the Regional Aviation System is adequate to meet the Region's near and long-term aviation needs. Specific airport or System deficiencies are also noted. In some cases, the system benchmarking or evaluation may show that there are actually surpluses or duplications in the System. This evaluation provides the foundation for subsequent recommendations for Study airports and for the Regional System of public-use airports.

It is important to note that some benchmarks used to evaluate the Regional Aviation System are action-oriented, while others are more informational in nature. The six performance measures evaluated in this chapter include the following:

- Capacity: Ability to provide airside and landside facilities to meet existing and future needs.
- Standards: Ability to meet applicable design standards.
- Economic Support: Ability to support the Region's economy.
- Compatibility: Ability to operate compatibly with adjacent land uses.
- Financial Responsibility: Ability to operate in a financially responsible manner.
- Accessibility: Ability to be accessible from both the air and the ground.

For the analysis completed in this chapter of the PAG RASP, the ability of all public-use airports in the System to meet each of the Study benchmarks was evaluated. While Davis-Monthan AFB is an important airport in the Study Area, since its facilities are not open to the public, this facility's ability to meet individual RASP benchmarks was not considered. However, the impact Davis-Monthan AFB has on the Region's airspace was considered in this phase of the RASP analysis.

The following sections of this chapter use each of the previously established System performance measures and their associated benchmarks to evaluate the existing airport system.

## Performance Measure: Capacity

One of the most important facets of a good airport system is its ability to accommodate both existing and future aviation demand. Each airport's means to provide adequate capacity is determined by the capability of its airside and landside facilities to meet user demand, both now and in the future. Benchmarks chosen to measure the adequacy of the Regional Aviation System, as it relates to capacity, focus on the ability of System airports to provide ample operational capacity and to meet other basic user needs. The primary focus of this performance measure, however, is on operational capacity. Benchmarks that will be used with the Capacity performance measure include the following:

- Percent of System airports operating above 60 and 80 percent of operational capacity (current, 2010, and 2030).
- Percent of Region, regional population, and regional business within the service area for an operational constrained airport.
- Percent of System airports with waiting lists for hangars.
- Percent of System airports with auto parking supply exceeding demand.

### Airside Capacity

Operational delays are undesirable within any airport system. Air travel is chosen as a transportation mode because of the time savings it offers. When aircraft encounter operational delays because of insufficient operational capacity, efficiencies gained through air transportation are diminished. In addition, when aircraft are forced to idle on the ground or circle in the air as a result of inadequate operational capacity, the likelihood of impacts on air quality increases.

For benchmarks related to operational capacity, an annual service volume (ASV) was obtained or calculated for all System airports. According to the FAA definition of annual operating capacity, ASV is reflective of an estimate of the total number of annual takeoffs and landings an airport can process when there is always an aircraft ready to land or depart.

There are a number of factors that influence each airport's ability to process annual operations, and these factors are used to determine each airport's specific ASV. Each airport's ability to process operational demand is influenced by factors such as the "mix" of the aircraft that operate at the airport. When large and small aircraft operate in the same traffic pattern, the spacing between aircraft must be increased. This need for increased spacing, when an airport's fleet mix is diverse, reduces operational capacity. In addition to fleet mix, other factors that determine an airport's ASV include its taxiway system, or lack thereof. Runways served by full parallel taxiways with appropriately spaced taxiway exits have higher operational capacities. Airports that support higher percentages of aircraft training also have higher ASVs. The presence of precision approach capabilities, an air traffic control tower, grooved runway pavement, and lighting also add to an airport's ability to process demand on an annual basis.

The FAA has determined that when annual operations (takeoffs plus landings) at an airport utilize about 60 percent of an airport's calculated annual operating capacity (ASV), some operational delays can be encountered. By the time an airport's demand versus capacity ratio reaches 80 percent, noticeable delays to operations can be anticipated. An airport can operate even when its annual operations consume 100 percent of its annual capacity, but delays are significant and frequent at this demand/capacity ratio.

For long-range planning, the FAA recommends that plans should be formulated to either increase capacity or to manage demand when operations at an airport reach 60 percent of the facility's annual operating capacity. When operations reach 80 percent of an airport's annual operational capacity, plans to address capacity shortfalls should be implemented.

*Benchmark: Percent of System airports, by category, that operate at 60/80 percent or more of their annual operational capacity (ASV) (current, 2010, and 2030).*

For this benchmark, each airport's ASV was either calculated or obtained from a recent airport-specific planning document, such as an airport master plan. Each airport's specific ASV was then compared to its 2000, 2010, and 2030 operational demand levels. The results of this exercise are presented in **Table 7-1** and are portrayed graphically in Exhibit 7-1. Results of the analysis completed in association with this capacity benchmark yielded the following information:

- In 2000, all System airports were operating below the 80 percent demand/capacity ratio. This finding indicates that few, if any, significant operational delays are being experienced at Study airports. The analysis does show, however, that one Level I airport, Tucson International, is now operating at 66 percent of its current ASV. Tucson International is the Region's only commercial service airport. As shown in Exhibit 7-1, for the current time frame, all Level II airports are operating below the critical 60 percent demand/capacity threshold, and 75 percent of the Level I airports are operating below the 60 percent demand/capacity ratio. For the System as a whole, 87 percent of the Study airports are operating under the 60 percent demand/capacity threshold.
- By 2010, Tucson International, the Region's only commercial service airport, continues to be the only Study airport whose demand/capacity ratio exceeds 60 percent. As shown in Table 7-1 and Exhibit 7-1, by 2010, without enhancements to its current ASV, Tucson International's projected annual demand will exceed 80 percent of its existing ASV. According to RASP calculations, without projects to increase its operational capacity, Tucson International is projected to reach an 81 percent demand/capacity ratio by 2010. This translates into 13 percent of all System airports exceeding the 80 percent demand/capacity threshold in 2010. In 2010, all Level II airports are expected to be operating below the 60 percent demand/capacity threshold.
- By 2030, Tucson International, the Region's only commercial service airport, continues to be the only Study airport exceeding the 80 percent demand/capacity ratio. However, by 2030, one additional Level I airport, Ryan Airfield, is projected to exceed the 60 percent demand/capacity ratio. By 2030, annual operations at Ryan Airfield are projected to consume an estimated 69 percent of the airport's ASV. Marana Northwest Regional Airport (See Table 7-1) will approach or possibly exceed the 60 percent demand/capacity threshold by 2030. As shown in Exhibit 7-1, by 2030, 50 percent of the Level I airports are expected to exceed the 60 percent demand/capacity

threshold. This translates into 25 percent of all Study airports operating above the 60 percent demand/capacity level in 2030.

- As shown in Table 7-1, for all System airports, current demand is estimated to be utilizing approximately 30 percent of all available System operational capacity. The Region's demand/capacity ratio for all Study airports is expected to increase to 43 percent by 2030. While demand at all Level II airports is expected to be well below available operating capacity, the situation is somewhat different for Level I airports. For the current time frame, annual operational demand at Level I airports is consuming an estimated 44 percent of their current ASV. Without enhancements to their ASVs or without the designation of additional Level I airports in the System, the demand/capacity ratio for current Level I airports will be 65 percent by 2030.

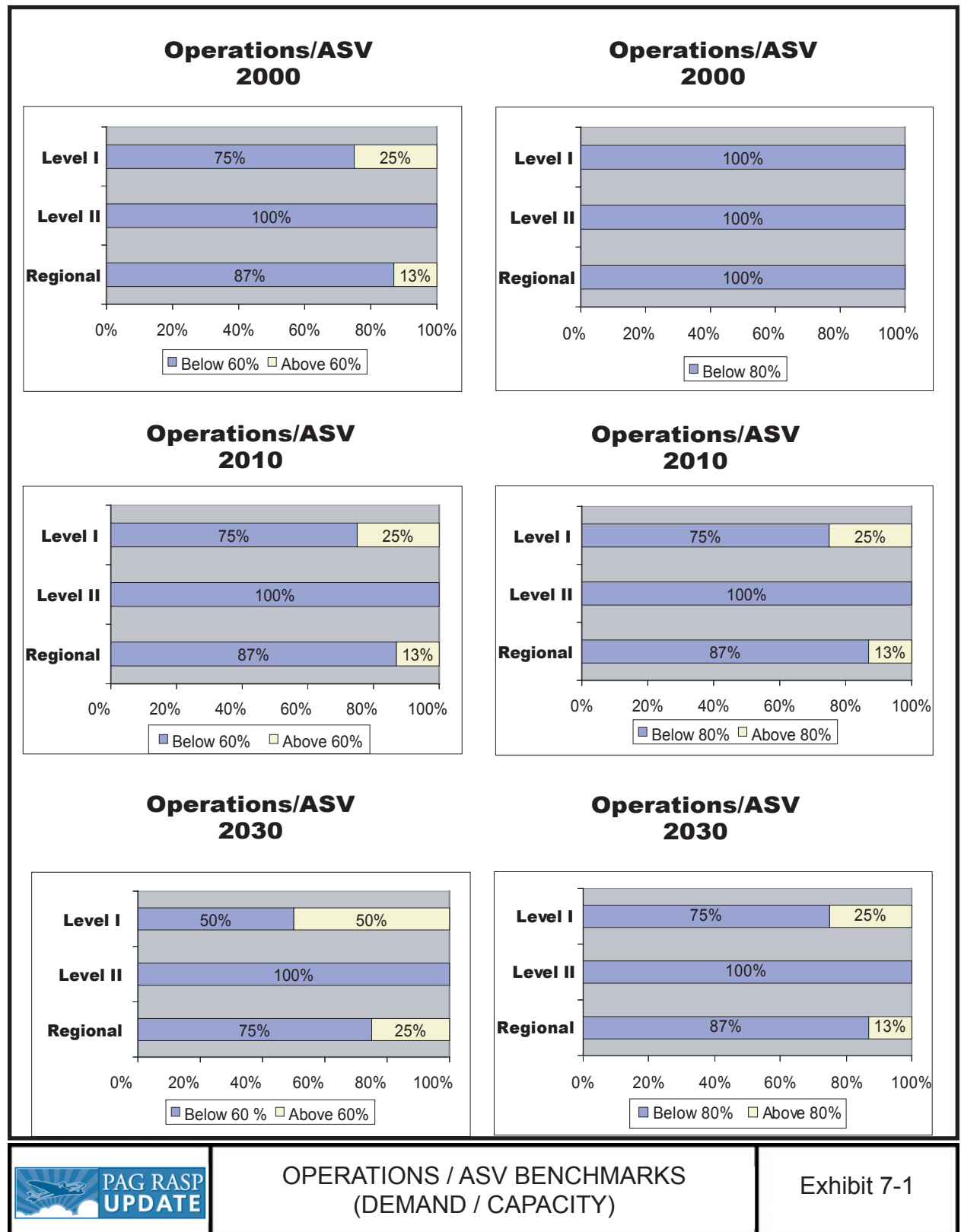
**Table 7-1**  
**ANNUAL OPERATIONAL CAPACITY BASED ON OPERATIONS**  
**AND ANNUAL SERVICE VOLUME (ASV) (DEMAND / CAPACITY)**

Level	Airport	Demand			ASV	% Demand / Capacity		
		2000	2010	2030		2000	2010	2030
Level I	Tucson International	250,943	309,214	348,028	380,000	66.04%	81.37%	91.59%
	Ryan Airfield	174,461	197,200	243,440	355,000	49.14%	55.55%	68.57%
	Marana Northwest Regional	71,300	99,540	134,300	230,000	31.00%	43.28%	58.39%
	Pinal Airpark	18,815	18,815	18,815	195,000	9.65%	9.65%	9.65%
	Level I Total	515,519	624,769	744,583	1,160,000	44.44%	53.86%	64.19%
Level II	La Cholla Airpark	4,000	12,960	16,800	204,000	1.96%	6.35%	8.24%
	Benson Municipal	500	9,875	25,675	175,000	0.29%	5.64%	14.67%
	Ajo Municipal	1,900	3,160	5,925	175,000	1.09%	1.81%	3.39%
	Sells	1,310	1,965	3,275	130,000	1.01%	1.51%	2.52%
	Level II Total	7,710	27,960	51,675	684,000	1.13%	4.09%	7.55%
Regional Total		523,229	652,729	796,258	1,844,000	28.37%	35.40%	43.18%

GIS analysis was also used to determine the potential impacts of the near- and long-term operational capacity constraints identified in Table 7-1 and **Exhibit 7-1**.

*Benchmark: Percent of Region, its population, and employment within a 30-minute drive time of a System airport exceeding 60/80 percent demand/capacity (current, 2010, and 3030).*

**Table 7-2** presents the results of the GIS analysis for the Capacity performance measure. While an airport that could experience potential shortfalls in its operational capacity impacts a small percentage of the Study Area, geographically, barring the implementation of capacity-enhancing projects, a more significant percent of the Area's population and employment is within a 30-minute drive time of a potentially constrained System airport.



**Table 7-2**  
**CONSTRAINT IMPACTS**

	Area Within 30 Minutes of a Capacity-Constrained Airport (Square Miles)	Population Within 30 Minutes of a Capacity- Constrained Airport	Employment Within 30 Minutes of a Capacity- Constrained Airport
<b>2000</b>			
60% or Greater	350 sq. m.	398,122	154,381
80% or Greater	None	None	None
% of Total 60%	4%	47%	70%
% of Total 80%	N/A	N/A	N/A
<b>2010</b>			
60% or Greater	None	None	None
80% or Greater	350 sq. m.	398,122	154,381
% of Total 60%	N/A	N/A	N/A
% of Total 80%	4%	47%	70%
<b>2030</b>			
60% or Greater	476 sq. m.	174,723	61,247
80% or Greater	350 sq. m.	398,122	154,381
% of Total 60% *	5%	20%	28%
% of Total 80% *	4%	47%	70%

\* It is worth noting that Tucson International and Ryan Airfield have a slight overlap in their service areas.

As noted in Table 7-1, Tucson International is the airport in the System that is expected to encounter the greatest potential shortfall in both its near, and longer-term operational capacity. Ryan Airfield, the primary “reliever” airport for Tucson International, could also experience shortfalls in operational capacity by the end of the 30-year planning period.

It is important to note when reviewing the information summarized in Table 7-2 that the 30-minute service areas for Tucson International and Ryan Airfield have a slight overlap. Consequently, by the end of the 30-year planning period, population and employment in the Study Area affected by an airport with potential operational capacity constraints could be somewhat less than the figures reported in this table.

As shown in Table 7-2, however, by the end of the 30-year planning period, it is possible that between 50 and 60 percent of the Region’s population and 70 and 80 percent of its employment could be within the 30-minute service area of an airport with some level of operational delay. It is important to note that this



finding is based on each airport's existing operational capacity; it does not take into account capacity-enhancing projects that may be programmed by any airport in the System.

## **Landside Capacity**

For an airport system to be efficient, its facilities must be able to not only effectively process operational demand, but also meet other needs of airport users. Aviation system plans, such as the PAG RASP, are not intended to take the place of individually prepared airport master plans. Consequently, the level of facility analysis contained in the RASP will not be comparable to that conducted in an airport-specific master plan.

To determine the adequacy of the landside facilities at System airports, two factors were examined. Factors considered in this part of the System evaluation included the adequacy of existing storage (hangar) space at Study airports and the adequacy of current auto parking facilities.

*Benchmark: Percent of System airports, by category, with hangar waiting lists.*

The need to provide additional covered storage for based aircraft varies by airport. However, given climatic, cost, security, and other considerations, nationally there is a growing trend for owners of general aviation aircraft to seek covered storage. Since hangar development typically does not qualify for Federal or State grants, the need for hangar development can sometimes lag behind an airport's ability to provide such facilities. Third-party developers, such as an airport's fixed based operator (FBO), often finance hangar development. An FBO is a person or a business that provides on-site airport services such as fueling, maintenance, repair, and aircraft storage. Most general aviation airports are unable to provide additional hangar storage until demand is substantiated, often in the form of an "upfront" deposit. It is also not uncommon, in a given geographic area, for aircraft owners to have their names on hangar waiting lists at more than one airport, indicating they are interested in occupying the first available hangar space.

Given the generally ideal weather conditions in the Tucson area, many aircraft owners, especially of smaller, less sophisticated single-engine aircraft, are willing to "tie down" their aircraft on an open ramp area, as opposed to having their aircraft in covered storage. There are no FAA requirements for the percentage of aircraft that should be, or that typically are, stored in hangars.

To provide a general assessment of the adequacy of existing hangar space at System airports, two factors were reviewed. These factors consisted of the number of individuals reported on "hangar waiting lists" at all System airports and a comparison of current based aircraft counts at all System airports to the number of covered parking spaces reported as part of the RASP inventory effort. This information is summarized in **Table 7-3**.

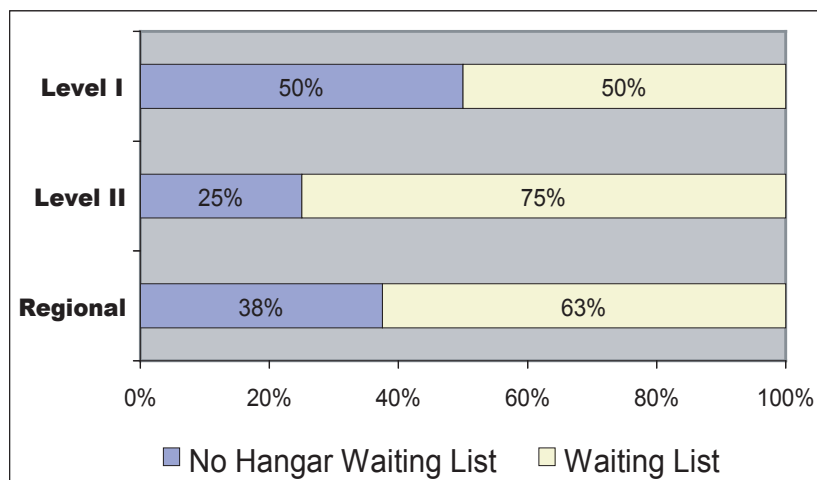
**Table 7-3**  
**HANGAR CAPACITY BENCHMARK**

	Airport	2001 Based	2001 Covered Spaces	Hangar Waiting List	Reported Number on Waiting List
Level I	Tucson International	320	266	No	None
	Ryan Airfield	256	179	No	None
	Marana North West	228	156	Yes	279
	Pinal Airpark	58	3	Yes	25
Level II	La Cholla	92	92	Yes	37
	Benson Municipal	5	None	Yes	20
	Ajo Municipal	5	8	Yes	7
	Sells	0	None	No	None
Total		954	700	N/A	229

As reflected in the information presented in Table 7-3, the number of aircraft based at System airports presently without covered storage is similar to the number of aircraft reported on hangar waiting lists at all airports, approximately 250 planes. This fact could indicate that, if given a choice, most aircraft owners now based at Study airports would prefer to have their aircraft in coverage storage.

As shown in **Exhibit 7-2**, 50 percent of the Level I airports have hangar waiting lists, and 75 percent of the Level II airports have hangar waiting lists. Systemwide, over 60 percent of the Study airports report

**Exhibit 7-2**  
**HANGAR WAITING LIST BENCHMARK**



they have based aircraft waiting for hangars. With this percentage of the airports in the System reporting aircraft on waiting lists for covered storage, there appears to be a shortfall of available hangar space in the System.

*Benchmark: Percent of System airports, by category, with auto parking facility supply exceeding demand.*

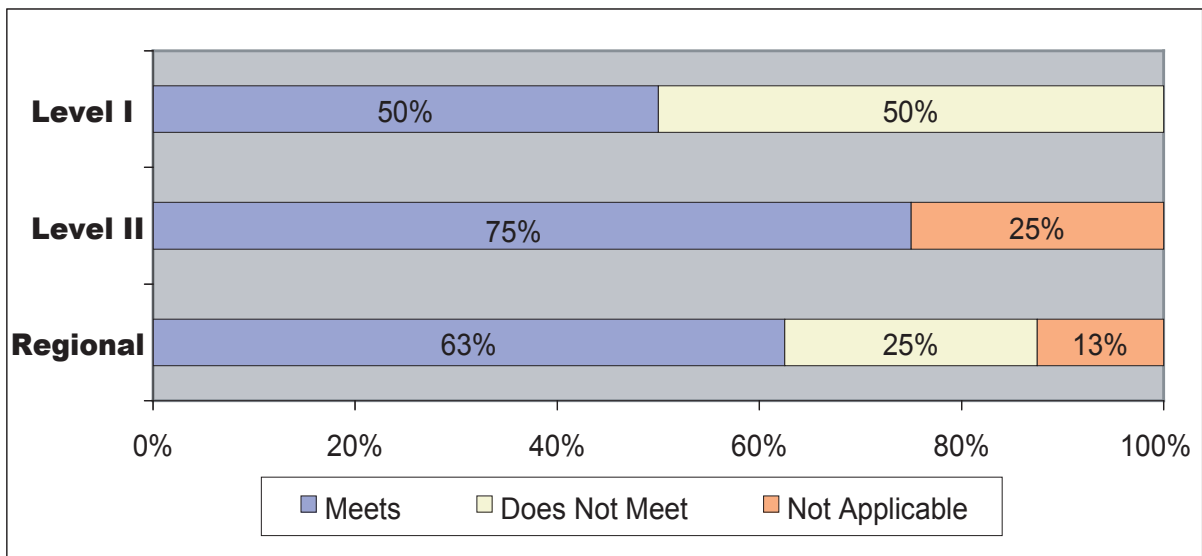
It is often difficult to accurately identify the number of “actual” spaces available for general aviation-related auto parking. Many smaller general aviation

airports have unpaved parking areas. At some airports, it is not uncommon for aircraft owners to park their cars in their hangar when flying their plane. Autos are often parked in non-paved areas near hangar storage facilities. With the events of September 11, new security guidelines on both the State and Federal levels for commercial and general aviation airports have been, and are being, formulated. As a result, it is possible that auto parking in aircraft movement areas may become totally restricted, or at least more restricted, in the future. As result, airports should plan to provide auto parking in designated areas away from hangar and other areas of aircraft movement.

General aviation auto parking requirements are most often tied to the number of based aircraft. At busier general aviation facilities, there may also be a need to provide parking for employees, visitors, and airport businesses such as rental cars. Based on their roles in the System, the RASP identified different auto parking objectives for Level I and Level II airports. Because they are typically busier and serve greater volumes of demand, Level I airports should ideally have paved auto parking equal to the airport's number of based aircraft to accommodate the needs of visitors, employees, and on-airport businesses. Level II airports should have designated paved auto parking equivalent to 75 percent of the number of based aircraft.

Using these facility objectives developed in the RASP, each Study airport was reviewed to determine the ability of current auto parking facilities to meet these objectives. The results are graphically depicted in **Exhibit 7-3**. As shown in this exhibit, 50 percent of the Level I airports currently have auto parking facilities to meet the objectives established for Level I airports. For Level II airports, 75 percent of these facilities are currently meeting the auto parking objectives. Systemwide, 63 percent of all airports now meet the RASP's objectives for auto parking. As demand at System airports grows over the next 30 years, it is possible that some Study airports that are now meeting the auto parking objectives may find themselves unable to comply with this objective unless additional auto parking facilities are provided.

**Exhibit 7-3**  
**AUTO PARKING SPACE BENCHMARK**



## Summary for Capacity Performance Measure

The ability of System airports to meet both airside and landside demand was investigated as part of this performance measure. The results show that, without projects to increase its operational capacity, Tucson International may face shortfalls over the planning period. Furthermore, if demand grows as has been projected in the RASP, Ryan Airfield could also experience modest operational delays by the end of the planning period. These could trigger the need to provide additional operational capacity. Information presented in the Capacity performance measure shows that operational demand at Level I airports could saturate a notable percentage of available operational capacity by the end of the planning period.

Benchmarks used in association with the Capacity performance measure also show that improvements to the System's hangar storage facilities and auto parking facilities appear to be needed. Information presented in the System benchmarking analysis reveals that the number of based aircraft in the System currently without covered storage roughly equals the number of aircraft reported on waiting lists for hangars throughout the System. This finding indicates there is a current shortfall in covered storage facilities throughout the System that will grow over the planning period.

Finally, analysis of the Capacity performance measure shows that some System airports lack designated auto parking facilities equal to the objectives for Level I and Level II airports. With the need to increase security at airports throughout the country, having designated auto parking areas not co-located with aircraft movement areas makes sense. A current shortfall for auto parking facilities has been identified in this analysis. As demand levels increase at System airports in the coming years, this shortfall will grow unless additional designated auto parking facilities are provided.

## Performance Measure: Standards

One of the most important characteristics of a good airport system is the system's ability to meet applicable design standards. Generally speaking, when airports in any system comply with such standards, this helps to promote a system of safe and efficient airports. While each airport's ability to meet standards is primarily a master planning issue, it is important for the RASP to provide at least a general overview of the System's ability to conform to appropriate standards.

Benchmarks that will be used to evaluate the System for this performance measure include the following:

- Percent of System airports, by category, with runway and taxiway separations that meet their current FAA airport reference code (ARC).
- Percent of System airports, by category, with runway safety areas (RSAs) on their primary runway that meet standards determined by their current ARC.
- Percent of System airports that meet the ADOT standard for having a pavement condition index (PCI) of 80 or greater on their primary runway.
- Percent of System airports with shared airspace, resulting in operating agreements/restrictions.

- Percent of System airports with obstructions that impact their approach minimums.

The results of the System evaluation for these benchmarks related to the Standards performance measure are discussed in the following sections.

*Benchmark: Percent of System airports with runway/taxiway separations that meet current airport reference code (ARC).*

Each airport in the Federal System (all airports included in the FAA's NPIAS document are included in the Federal System) is encouraged by the FAA to meet all applicable design and development standards. The FAA, in its advisory circulars, provides specific guidance on which standards are applicable to each airport. Each airport's individual design standards are determined by the most demanding aircraft that operates at the airport on a regular basis. This aircraft is known as the design, or critical, aircraft. The design aircraft is the most demanding aircraft that performs at least 500 takeoffs and landings at the airport during the year. Although Sells is not currently recognized in the NPIAS, the airport is expected to meet FAA requirements. La Cholla Airpark is a private airport not considered applicable to the standards set by the FAA and required upon airports recognized in the NPIAS.

Once an airport's design aircraft is determined (this determination is made during the development of an airport-specific master plan or airport layout plan (ALP)), then applicable design standards can be identified. Each airport's design standards are related to the approach speed and the wingspan of its design aircraft. Within the FAA's planning guidelines, these two parameters are used to determine each airport's airport reference code (ARC). The ARC for each airport is defined by a letter and a Roman numeral. The letter, A, B, C, or D, is defined by the approach speed of the design aircraft, while the Roman numeral, I, II, III, IV, or V, is identified based on the wingspan of the design aircraft. Current ARCs for Study airports, as derived from other source documents, are as follows:

Level I

- Tucson International – D-V
- Ryan Airfield – B-II
- Marana Northwest Regional – C-II
- Pinal Airpark – D-III

Level II

- La Cholla Airpark – B-I
- Benson Municipal – B-I
- Ajo Municipal – B-I
- Sells – B-I

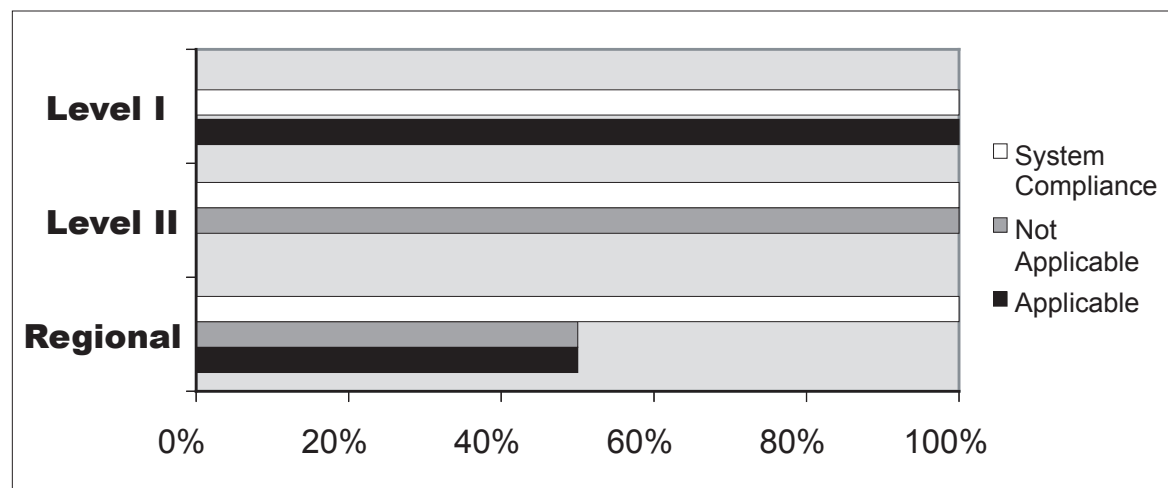
For this analysis, the ARC for all System airports was derived, when possible, from each airport's most recent master plan or ALP. If an existing ARC was not available, information from the RASP inventory effort was used to establish an appropriate reference code. The appropriate distance from the runway centerline to the taxiway centerline (assuming that a parallel or partial parallel taxiway is available) is determined by each airport's individual ARC. The required separation distance varies by ARC.

To determine if System airports currently meet their appropriate runway and taxiway separation, information from current master plans, ALPs, aerial photos, and on-site inspections was used. It is important to note in evaluating this benchmark that not all System airports have a parallel or partial parallel taxiway; therefore, this benchmark is not applicable to those airports.

The review of this benchmark indicates that all Level I airports, Tucson International, Ryan Airfield, Marana Northwest Regional, and Pinal Airpark, have some type of taxiway system. For their current ARCs, each of these Level I airport meets its appropriate runway and taxiway separation. This results in a 100 percent compliance rating for this portion of this benchmark.

For the Level II airports, La Cholla, Benson Municipal, Ajo Municipal, and Sells, only La Cholla Airpark has a taxiway. Based on the airport's current ARC, the centerline-to-centerline separation of the runway and taxiway meets FAA guidelines. As shown in **Exhibit 7-4**, for all applicable airports, the System has a 100 percent compliance rating for this benchmark.

**Exhibit 7-4**  
**RUNWAY TO PARALLEL TAXIWAY SEPARATION BENCHMARK**



*Benchmark: Percent of System airports with runway safety areas (RSAs) on their primary runway that meet their current ARC.*

As with the separation from runway to taxiway centerline, the dimensions for the runway safety area (RSA) are determined by the individual ARC of each airport. The RSA is the area off each runway end that, in accordance with FAA standards, should be free and clear of any obstructions; the RSA should also be graded. The dimensions of the RSA vary based on applicable design standards. The RSA is designed to promote and increase airport safety.

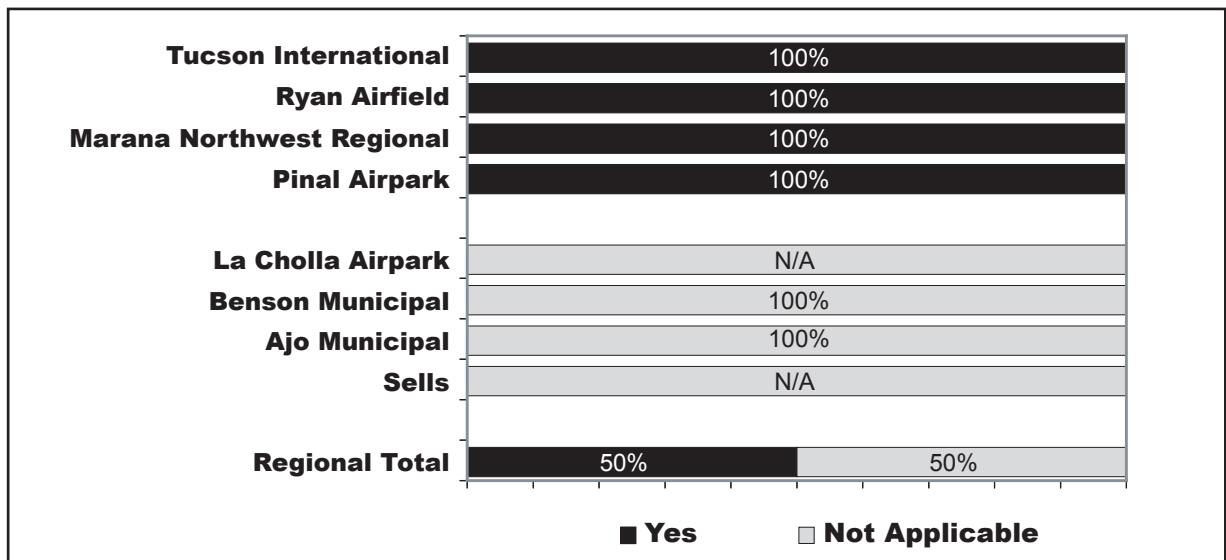
As with all FAA planning standards and guidelines, only Federally eligible airports are required to meet FAA standards; airports are Federally eligible when they are included in the National Plan of Integrated Airport Systems (NPIAS). Since La Cholla is a privately owned airport, it is not required to meet FAA guidelines. Even though Sells Airport is a public airport, it is not, at this time, included in the list of Fed-

erally eligible airports. Sells is not presently included in the NPIAS. Since it is anticipated that Sells will apply for Federal eligibility, it should strive to meet applicable FAA standards as dictated by its ARC.

For the Level I airports in the RASP System, all airports currently have RSAs on their primary runways that meet the width and length objectives dictated by each airport's respective ARC. For the Level II airports, both existing Federal System airports (Benson Municipal and Ajo Municipal) have RSAs that meet the requirements dictated by their respective ARCs. RSAs on the primary runways at Sells and La Cholla do not meet FAA guidelines. Ideally, although not a public airport, La Cholla should try to provide facilities that are in compliance with FAA guidelines. Technically, this benchmark is not applicable to La Cholla Airpark, nor is it currently applicable to Sells, since Sells is presently not included in the NPIAS.

This results in a 100 percent compliance rating for all Level I airports and all applicable Level II airports in the System. (See **Exhibit 7-5**.) Prudent planning dictates that all System airports should strive to comply with RSA requirements on the ends of their primary runway. Therefore, as future planning and development at all System airports takes place, there should be an emphasis on projects that enable System airports to be compliant with their respective RSA guidelines.

**Exhibit 7-5**  
**RUNWAY SAFETY AREA COMPLIANCE BENCHMARK**



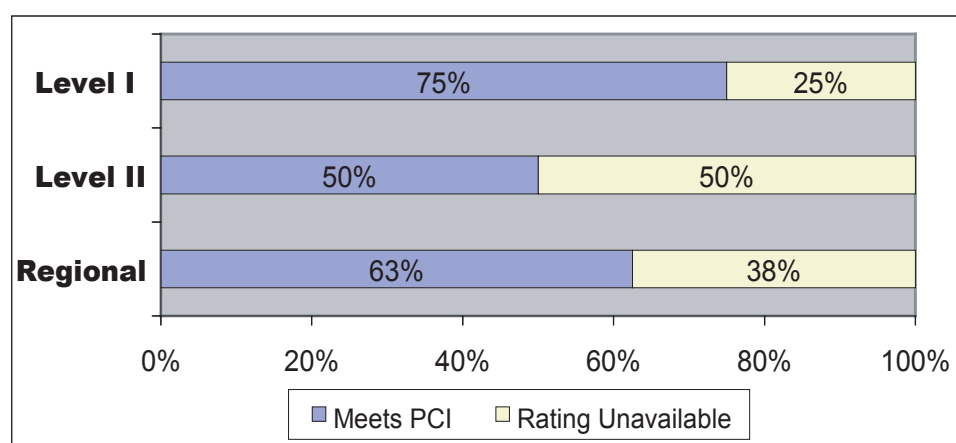
*Benchmark: Percent of System airports that meet ADOT guidelines for having a pavement condition index (PCI) of 80 or greater on their primary runway.*

Investment in the development and maintenance of paved surfaces at all System airports represents a significant level of investment each year. ADOT has undertaken, on a statewide basis, a program to evaluate the condition of pavement at most public airports in Arizona. Through its statewide efforts on pavement management, ADOT has determined that maintaining runway pavements to a certain standard helps to prevent major, costly runway reconstruction projects.

As part of ADOT's pavement management plan, the condition of pavements at RASP airports, with the exception of Pinal Airpark, La Cholla Airpark, and Sells, has been previously evaluated. Information obtained from ADOT for use in the PAG RASP indicates that all Study airports (with the exception of those previously noted for which no analysis has been undertaken) now meet the ADOT guideline for having a pavement condition index (PCI) of 80 or greater on their primary runway.

Exhibit 7-6 presents the findings for this benchmark.

**Exhibit 7-6**  
**PAVEMENT CONDITION INDEX BENCHMARK**



*Benchmark: Percent of System airports with shared airspace resulting in operating agreements/restrictions.*

Shared airspace applies to 75 percent of the System airports. The presence of Davis-Monthan Air Force Base, an active military airport facility, and bombing and practice ranges creates an opportunity for the military to control much of the airspace over the Study Area. Controlled airspace consists of those areas designated as Class A through Class E airspace, along with airport radar service areas (ARSAs). Airspace control is reliant on air traffic density, proximity to an airport, geographical factors, and height above sea level. Airspace controls exist to supplement safety measures, to meet user needs, and to monitor aircraft activity.

Overlapping airspace can restrict airport growth and can also be a factor in planning future expansion projects. Tucson International and Davis-Monthan Air Force Base share overlapping Class E Airspace with a floor 700 feet above the surface. Military and commercial flight patterns are carefully regulated throughout the shared area. Personnel who man control towers at both of these airports are skilled in maintaining the required separations between aircraft. Proximity and activity levels must be considered for growth objectives at Tucson International and training routes for Davis-Monthan Air Force Base.

Ryan Airfield shares minimal airspace with Tucson International, but essentially operates without airspace restrictions. Ryan Airfield, La Cholla Airpark, and Pinal Airpark are within Class E Airspace with



limited operating restrictions. Benson Municipal and Marana Northwest Regional represent the airports without shared airspace.

Within the Study Area, there are many areas with airspace restrictions due to the military activities they accommodate. Restricted areas contain airspace identified by an area on the surface of the earth within which the flight of aircraft, while not wholly prohibited, is subject to restrictions. Restricted areas denote the existence of unusual, often invisible, hazards to aircraft such as artillery firing, aerial gunnery, or guided missiles. Penetration of restricted areas without authorization from the agency using, or in control of, the restricted areas may be extremely hazardous to the aircraft and its occupants. Restricted areas are published in the Federal Register and are depicted on aeronautical sectional charts.

Restricted airspace adjacent to and north and west of Ajo Municipal, limits flight patterns and operations for aircraft using this airport. Ajo Municipal has operating guidelines with the United States Air Force. The USAF Goldwater Range is an active bombing range used for regular military training. Aircraft from Davis-Monthan Air Force Base, Luke Air Force Base, Tucson ANG, the U.S. Army National Guard, the Air Force Guard and Reserve, and the U.S. Navy operate routine tactical and bombing missions throughout this area. Air-to-ground weapons delivery, air-to-air weapons delivery, air combat tactics, intercepts, basic flight maneuvers, and target ingress and egress training are accomplished on the Goldwater Range. The general aviation corridor extends from Gila Bend Air Force Auxiliary Field (AFAF) to Ajo Municipal over Arizona Highway 85 at 500 feet above ground level. Visual Flight Rules (VFR) govern that civilian flight and air evacuation aircraft have priority.

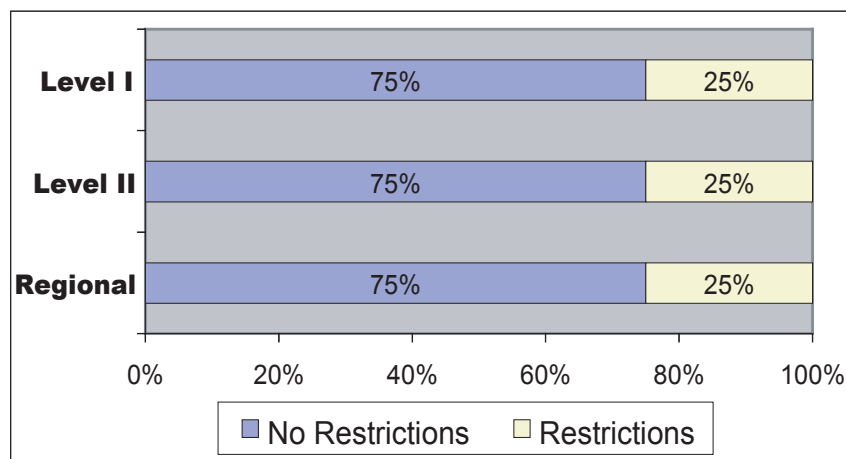
Southbound to Ajo Municipal, pilots must contact Gila Bend AFAF Tower for clearance through the Class D airspace. Approval must be granted before traveling south of the Black Gap and West of Highway 85. Range operations should be advised when passing Crater Range and Ajo Municipal. Traveling northbound to Ajo Municipal, range operations should be contacted prior to entering the corridor. Regular reports should be made while flying through the corridor and range.

The Department of the Air Force Air Education and Training Command issued letters of notice to all Arizona airport managers and Fixed Based Operators. The statement clearly states that military training is common in Arizona during daylight hours. Ajo Municipal and Sells are both within a Military Operating Area (MOA). This is an airspace assignment of defined vertical and lateral dimensions established outside positive control areas to separate/segregate certain military activities from IFR traffic and identify for VFR traffic where these activities are conducted. While the FAA rule does not prohibit civilian VFR traffic from traveling through an active MOA, it is strongly discouraged. Published times of use do not mean an MOA is active during the entire time. Every effort is made to return the airspace to the controlling agency when it is not being utilized for military training. Most MOAs have accompanying Air Traffic Control Assigned Airspace above FL 180.

Military Training Routes (MTRs) extend throughout Pima County and can be observed on the area's aeronautical sectional chart. These routes are used by the Department of Defense for the purpose of conducting low-altitude navigation and tactical training at airspeeds in excess of 250 Knots Indicated Air Speed (KIAS) below 10,000 feet mean sea level (MSL). There are designated Visual Flight Rule MTRs and Instrument Flying Rule MTRs. While FAA and special-use airspace do not specifically designate MTRs, they do have potential impacts on general aviation operations in the affected areas.

**Exhibit 7-7** depicts the ability of System airports to meet and comply with the airspace benchmark. While several of the Study Airports do have areas of shared airspace, only Tucson International and Ajo Municipal experience any changes in their operating patterns as a result of these airspace overlaps.

**Exhibit 7-7**  
**RESTRICTED AIRSPACE BENCHMARK**



*Benchmark: Percent of System airports with obstructions that affect their approaches.*

One of the goals for the System of airports that serves the RASP Study Area is that these airports operate in not only an efficient manner, but also in a safe manner. One of the key factors influencing airport operational safety relates to obstructions in the airport operating environment. Obstructions can be either natural or manmade in nature. The FAA, within its FAR Part 77, has established those areas in the environs of each airport that should be kept clear and free of obstructions. Part 77 consists of a series of imaginary surfaces around an airport, centered on the runway centerline, that extend outward and upward at various distances and angles depending on airport-specific approach factors.

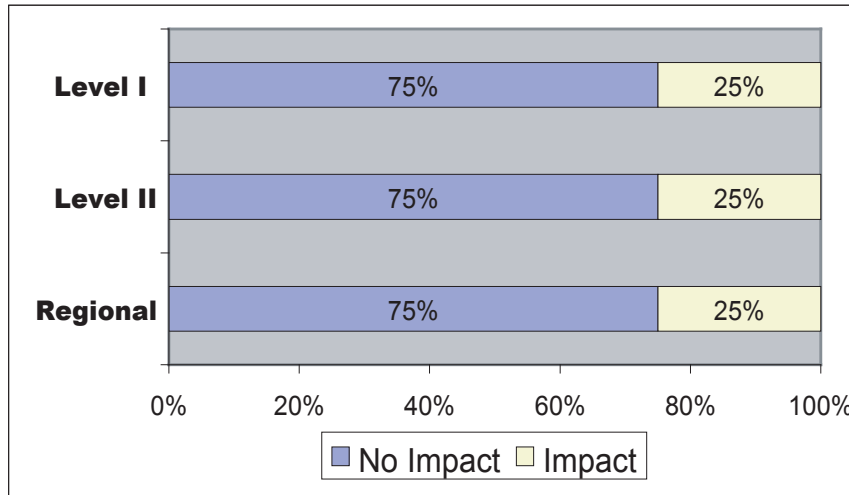
Detailed obstruction analysis within Part 77 surfaces is part of a comprehensive airport master plan. For the RASP analysis, however, a review was undertaken to identify System airports that reportedly have obstructions within their runway approaches.

The RASP inventory process, on-site visits to System airports, discussions with airport operators, and review of airport-specific FAA 5010 Forms and airport master plans indicate that four of the eight RASP airports have noted obstructions. Obstructions noted for both Sells and Ajo Municipal are related to brush within the primary surface of the runway, and do not impact the runway approaches at these airports. Terrain in the vicinity of La Cholla Airpark results in displaced thresholds on the approaches to both runway ends; there is a 200-foot displacement on Runway 19 and a 100-foot displacement on Runway 01. At Marana Northwest Regional, the location of Avra Valley Road in the approach to Runway 03 also results in a displacement to the approach to this runway end; this displacement is 295 feet.

As shown in Exhibit 7-8, 75 percent of the Level I airports and 75 percent of the Level II airports have no reported obstructions that impact their current approaches. Systemwide, 25 percent of the airports

being analyzed in the RASP do, however, have either natural or manmade obstructions that impact their approaches. In both instances, these obstructions result in displaced landing thresholds.

**Exhibit 7-8**  
**OBSTRUCTION BENCHMARK**



**Summary for Standards Performance Measure**

Having a system of airports operating in a safe manner is an important RASP goal. One of the best ways to ensure a safe airport system is to promote system compliance with applicable design and development standards and guidelines. While standards compliance is more of a master planning issue than a system planning issue, the RASP provides a review of the Regional Aviation System's ability to comply with some of the most important standards.

Standards reviewed for this performance measure are primarily those established by the FAA. From a safety standpoint, all airports should ideally strive to meet these standards. However, only those airports in the Federal Airport System (all NPIAS airports receiving FAA grants for their development) are actually required to comply with FAA design and development standards analyzed in this performance measure. As a result, La Cholla Airpark, a privately owned airport, and Sells Airport, a non-NPIAS facility, are not required to comply with FAA standards.

Analysis completed as part of this performance measure indicates that most Federally eligible airports in the RASP System meet applicable FAA standards. Airports are generally compliant with their appropriate ARC design standards for runway-taxiway separations and RSAs. Most System airports also appear to meet ADOT guidelines for pavement condition of their primary runways, and only two airports have obstructions that have modest impacts on their approaches. The Study Area has numerous military operating and training areas. Despite the prevalence of these areas, most System airports do not have airspace overlaps restricting their operations.

## Performance Measure: Economic Support

Airports not only support the Region's transportation needs, but also many of its economic goals and objectives. This performance measure of the RASP established a series of benchmarks that provides insight into how well the Regional Aviation System is performing in terms of its ability to support the Region's economy. Some of the benchmarks used to evaluate the System's ability to meet this performance measure vary in context from those used to evaluate other System performance measures. Benchmarks used to evaluate the System's ability to effectively support the regional economy include the following:

- The top origination and destination (O&D) markets with nonstop commercial airline service (1995 and 2000).
- Average weekly commercial airline seats departing Tucson (1995 and 2000).
- Average one-way commercial airline fare for Tucson and the U.S. (1995 and 2000).
- Percent of System airports with Part 135 operator and percent of Region within 30 minutes of an airport with a Part 135 operator.
- Percent of System airports supporting air cargo activity.
- Percent of Region within 30-minute drive time of a System airport with a 5,000 foot or greater runway length.

System evaluation for these economic-related benchmarks is discussed in the following sections.

*Benchmark: Top O&D points with nonstop commercial airline service (1995 and 2000).*

**Tables 7-4 and 7-5** provide information that gives a perspective on how commercial airline service changed in the Region from the completion of the last RASP in 1995.

Table 7-4 provides information that shows the number of average weekly nonstop seats departing Tucson International Airport. This table also indicates the origination and destination (O&D) rank of these markets. Information presented in Table 7-5 indicates the top 30 O&D city pairs for Tucson. As shown below, for Tucson's top 10 O&D markets, some markets experienced improved service (as measured by weekly departing seats (Table 7-4)) and some experienced a reduction in service between 1995 and 2000.

O& D Rank	City	Increase/Decrease in Weekly Departing Seats (1995-2000)
1	Los Angeles	Increase
2	Las Vegas	Decrease
3	San Diego	Increase
4	Chicago	Increase
5	Seattle	Increase/New Service
6	Dallas	Decrease
7	Denver	Decrease
8	San Jose	Decrease
9	Oakland	Decrease/Lost Service
10	Albuquerque	Increase

**Table 7-4**  
**AVERAGE NONSTOP WEEKLY SCHEDULED DEPARTING SEATS**  
**TO ALL DESTINATIONS FROM TUCSON INTERNATIONAL AIRPORT**

2000 Top 25 O&D Rank	Destination Airport	Code	1995	2000
<b>Domestic</b>				
-	Phoenix	PHX	13,334	13,625
1	Los Angeles	LAX	8,869	9,719
6	Dallas/Ft. Worth	DFW	10,101	8,990
4	Chicago-O'Hare	ORD	3,129	4,190
2	Las Vegas	LAS	4,721	3,776
7	Denver	DEN	3,500	3,383
3	San Diego	SAN	1,918	2,880
24	Houston-Bush	IAH	2,763	2,175
-	Cincinnati	CVG	662	2,045
17	Minneapolis-St. Paul	MSP	1,364	1,394
13	Salt Lake City	SLC	1,147	1,040
10	Albuquerque	ABQ	399	964
5	Seattle	SEA	0	483
8	San Jose	SJC	328	242
12	Newark	EWB	0	124
-	Orange County-Burbank	SNA	660	0
9	Oakland	OAK	274	0
-	El Paso	ELP	182	0
-	Bullhead City	IFP	68	0
	<b>Domestic Total</b>		<b>53,419</b>	<b>55,029</b>
<b>International</b>				
	Hermosillo	HMO	1,475	1,158
	Guyamas	GYM	702	0
	Ciudad Obregon	CEN	8	0
	<b>International Total</b>		<b>2,185</b>	<b>1,158</b>
<b>Total—Average Weekly Nonstop Seats</b>			<b>55,605</b>	<b>56,187</b>

Source: Official Airline Guide.

**Table 7-5**  
**DOMESTIC OUTBOUND O&D PASSENGERS AND**  
**ONE-WAY AVERAGE FARES**  
**TUCSON INTERNATIONAL AIRPORT**  
(years ending December 31)

Rank		Outbound O&D Passengers			2000 Percent of Total	Average One-Way Fare		
		1995	2000	AAG		1995	2000	AAG
1	Los Angeles	231,730	217,620	-1.2%	13.2%	\$ 46.54	\$ 56.79	4.1%
2	Las Vegas	111,180	106,840	-0.8%	6.5%	\$ 42.98	\$ 55.78	5.4%
3	San Diego	87,480	99,760	2.7%	6.1%	\$ 48.38	\$ 56.27	3.1%
4	Chicago-O'Hare	55,730	69,100	4.4%	4.2%	\$162.24	\$165.66	0.4%
5	Seattle	43,180	52,120	3.8%	3.2%	\$109.99	\$121.00	1.9%
6	Dallas/Ft. Worth	32,250	45,590	7.2%	2.8%	\$181.33	\$209.27	2.9%
7	Denver	44,280	42,440	-0.8%	2.6%	\$137.89	\$180.18	5.5%
8	San Jose	42,640	41,790	-0.4%	2.5%	\$ 84.14	\$116.25	6.7%
9	Oakland	32,780	40,180	4.2%	2.4%	\$ 79.39	\$102.75	5.3%
10	Albuquerque	17,780	33,540	13.5%	2.0%	\$113.51	\$ 60.49	-11.8%
11	San Francisco	32,440	33,050	0.4%	2.0%	\$ 90.83	\$109.30	3.8%
12	Newark	28,070	31,430	2.3%	1.9%	\$204.45	\$214.23	0.9%
13	Salt Lake City	31,870	30,480	-0.9%	1.8%	\$ 82.84	\$108.70	5.6%
14	Portland	26,390	28,260	1.4%	1.7%	\$105.94	\$121.52	2.8%
15	New York-LaGuardia	26,950	27,460	0.4%	1.7%	\$206.17	\$229.81	2.2%
16	Washington-National	25,850	26,580	0.6%	1.6%	\$230.12	\$226.09	-0.4%
17	Minneapolis/St. Paul	29,220	25,510	-2.7%	1.5%	\$164.67	\$177.78	1.5%
18	Sacramento	21,240	24,960	3.3%	1.5%	\$ 91.53	\$108.06	3.4%
19	Boston	30,680	24,470	-4.4%	1.5%	\$203.11	\$249.17	4.2%
20	Atlanta	18,660	23,630	4.8%	1.4%	\$205.57	\$232.66	2.5%
21	Kansas City	21,310	20,170	-1.1%	1.2%	\$107.92	\$127.19	3.3%
22	Ontario	21,900	19,440	-2.4%	1.2%	\$ 70.45	\$ 72.53	0.6%
23	Baltimore	14,620	18,280	4.6%	1.1%	\$211.80	\$223.94	1.1%
24	Houston-Bush	17,430	17,530	0.1%	1.1%	\$147.27	\$178.83	4.0%
25	Reno	19,620	17,260	-2.5%	1.0%	\$ 71.49	\$ 88.17	4.3%
26	Philadelphia	19,230	16,910	-2.5%	1.0%	\$204.92	\$254.67	4.4%
27	Detroit	15,550	15,720	0.2%	1.0%	\$200.30	\$195.54	-0.5%
28	St. Louis	13,530	15,460	2.7%	0.9%	\$152.73	\$144.89	-1.0%
29	Washington-Dulles	15,180	15,340	0.2%	0.9%	\$233.07	\$284.69	4.1%
30	Tampa	8,950	14,150	9.6%	0.9%	\$182.56	\$167.87	-1.7%
All Remaining Markets		<u>435,830</u>	<u>452,680</u>	<u>0.8%</u>	27.5%			
Total — All Tucson Markets		1,573,550	1,647,750	0.9%	100.0%	\$125.27	\$141.64	2.5%
Total — All U.S. Markets		361,589,460	432,334,740	3.6%		\$138.69	\$157.93	2.6%

The information presented in Tables 7-4 and 7-5 indicates that, in both 1995 and 2000, Tucson International had nonstop scheduled commercial airline service to nine out of its top 10 O&D points. Between 1995 and 2000, 50 percent of these top 10 O&D points saw an increase in the number of weekly departing seats and 50 percent experienced a decrease. Between 1995 and 2000, Tucson International gained nonstop service to Seattle, but lost nonstop service to Oakland. While average weekly departing nonstop seats increased from 55,609 to 56,193 between 1995 and 2000, Tucson International lost nonstop service to Orange County, Oakland, El Paso, and Bullhead City. During this same time frame, they gained new nonstop service to Seattle (#5 in O&D ranking) and Newark (#12 O&D ranking). Tucson International also recently gained new nonstop service to Atlanta, the market's 20<sup>th</sup> rated O&D point. Overall, between 1995 and 2000, the Tucson market saw a general improvement in nonstop service to its top O&D markets.

*Benchmark: Number of average weekly seats departing Tucson International (1995 and 2000).*

As shown in Table 7-4, the number of average domestic departing nonstop seats increased from 53,423 to 55,035 in 2000. This represented an approximate increase in nonstop weekly departing seats between 1995 and 2000 of 3 percent. Average weekly departing seats to international points decreased between 1995 and 2000 from 2,185 to 1,158. The Tucson market nevertheless experienced a gain in average weekly departing nonstop seats between 1995 and 2000.

*Benchmark: Average one-way commercial airline fares for Tucson International and U.S. (1995 and 2000).*

Table 7-5 presents information on average one-way fares for Tucson International. This table shows average one-way fares for the airport's top O&D markets in 1995 and 2000. This table also provides information on the airport's average one-way fare for all destinations and similar information for the U.S. as a whole. As shown in this table, while Tucson International's average one-way fare increased from \$125.27 to \$141.64 between 1995 and 2000 (a 2.5 percent increase), the airport's average one-way fare still continues to be below the average for the U.S. In fact, the average one-way fare at Tucson International declined between 1995 and 2000 in relation to the average one-way commercial airline fare in the U.S. The market's one-way average commercial airline fare, however, is above the average one-way fare from Phoenix. The average one-way fare from Phoenix is \$131, as compared to the \$141 from Tucson.

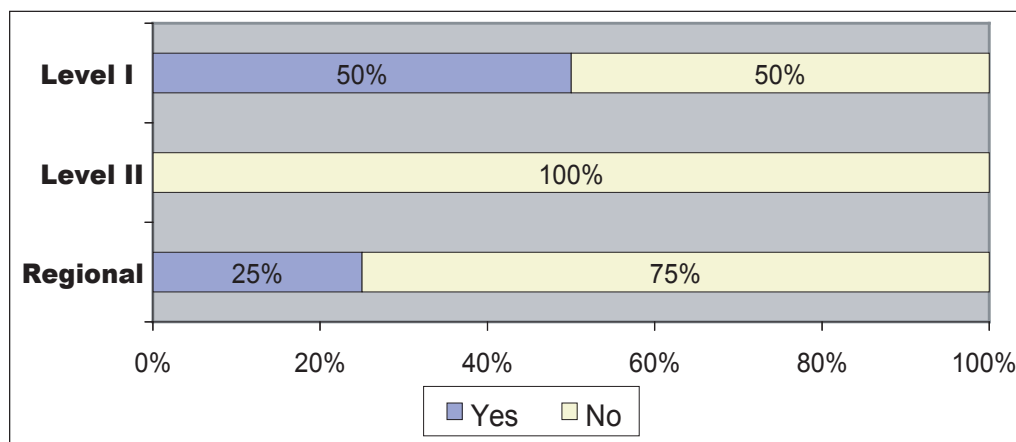
*Benchmark: Percent of airports and Region served by Part 135 operators.*

In addition to scheduled commercial airline service, general aviation aircraft provide an important source of air transportation for businesses, residents, and visitors. Since the events of September 11, 2001, on-demand air charter activity in the U.S. has increased substantially. Many individuals and companies seeking a more controlled and secure environment for their air travel have turned to on-demand service providers who operate general aviation aircraft. Within the air transportation industry, those licensed by the FAA to provide this on-demand charter/air taxi service are classified as Part 135 Operators.



Data from the RASP inventory was reviewed to determine those System airports that currently have Part 135 operators. According to information supplied by System airports during on-site visits that took place at the onset of the RASP, only two airports (Tucson International and Marana Northwest Regional) presently have Part 135 operators. As shown in **Exhibit 7-9**, 50 percent of the Level I airports meet this benchmark, while 0 percent of the Level II airports meet the Part 135 benchmark. Systemwide, this results in a 25 percent compliance rating for this benchmark.

**Exhibit 7-9**  
**PART 135 OPERATOR BENCHMARK**



For this particular benchmark, GIS analysis was also used to determine the percent of the population and employment in Pima County within a 30-minute drive of a System airport served by a Part 135 operator. As noted, Part 135 operators now serve two airports, Tucson International and Marana Northwest Regional. Combined, the 30-minute service areas for these two System airports serve almost 58 percent of the Study Area's population and 73 percent of its employment. This result indicates that well over half of the Study Area's population and almost 75 percent of its employers are within a 30-minute drive time of an airport with Part 135 on-demand/charter service.

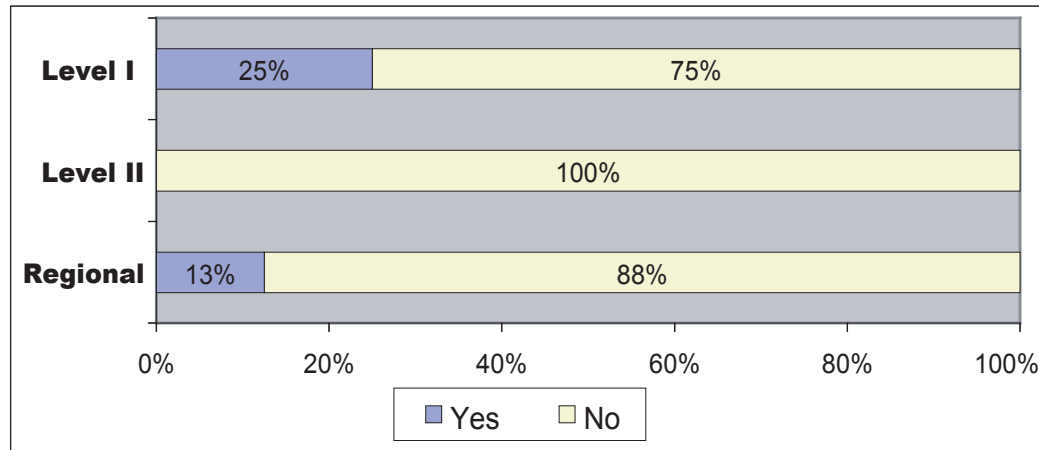
*Benchmark: Percent of System airports served by an all-air cargo carrier.*

Aside from relying on scheduled commercial and general aviation to meet their needs, many employers in the Study Area also rely on air cargo and express shipping to support their daily business activities. It is fairly typical throughout the U.S. to find all-cargo operators located at the same airports as the scheduled carriers, as they share similarities in terms of their activities, ground access, and facility needs.

**Exhibit 7-10** reflects the findings for this benchmark. Only one Level I airport and no Level II airports in the System are presently served by all-air cargo carriers. Tucson International is the only System airport with air cargo service. This results in a 13 percent compliance rating for the System for this particular benchmark. GIS analysis indicates, however, that even with this 13 percent compliance rating for this benchmark, 47 percent of the Study Area's population and 70 percent of its employment centers are still within a 30-minute drive time of air cargo services.



**Exhibit 7-10**  
**AIR CARGO BENCHMARK**



**Summary for Economic Support Performance Measure**

Results of the analysis completed for the benchmarks for the Economic Support performance measure show that scheduled commercial air service to the Region has improved. The number of weekly average departing seats has increased, as has service to the market's top O&D points. In addition, the Area's one-way average fare has remained below that for the U.S. as a whole. More than 58 percent of the Area's population and 75 percent of its employers are within a 30-minute drive time of an airport with a Part 135 operator. In addition, 47 percent of the Area's population and 70 percent of its employers are within a 30-minute drive time of an airport with air cargo services.

**Performance Measure: Compatibility**

By the very nature of the activity they accommodate, daily airport operations may have the propensity to impact areas that surround a particular facility. Through proper planning and proactive steps to control land use and activities that may be incompatible with airport activities, however, the compatibility between airports and areas that surround them can be markedly increased.

Both the FAA and the Department of Housing and Urban Development (HUD) have developed guidelines for land uses and activities that are generally considered compatible within an airport's operating environment. ADOT has followed these guidelines in establishing its directive to airports in the Arizona System in terms of mapping those areas that surround each airport with the potential to be impacted by airport operations. Airports that take steps to identify and coordinate with those areas and communities in proximity to the airport increase the likelihood of long-term compatibility and of community acceptance of expansion, when this expansion is needed.

For the Compatibility performance measure, actions that can be taken to promote compatibility between the airports and their surrounding environs were used as the benchmarks for the System's evaluation.

Benchmarks used to determine the existing System's ability to satisfy the Compatibility performance measure include the following:

- Percent of System airports with Part 77 height zoning controls.
- Percent of System airports included in local comprehensive plans or vision statements.
- Percent of System airports with a current master plan or airport layout plan (ALP).
- Percent of System airports with a current noise contour.
- Percent of System airports that have followed ADOT guidelines for preparing an airport influence area map and enforcing public disclosure on real estate transactions.

*Benchmark: Percent of System airports with identified Part 77 surfaces.*

The FAA defines FAR Part 77 surfaces. Part 77, Objects Affecting Navigable Airspace, establishes standards for determining structures that pose potential obstructions to air navigation. Part 77 does so by defining specific airspace areas around an airport that cannot contain any protruding objects. These airspace areas are referred to as "imaginary surfaces." Objects that are possible Part 77 obstructions include existing or proposed natural growth, terrain, or permanent/temporary equipment. Imaginary surfaces outlined in Part 77 include the following:

- Primary surface
- Transitional surface
- Horizontal surface
- Conical surface
- Approach surface

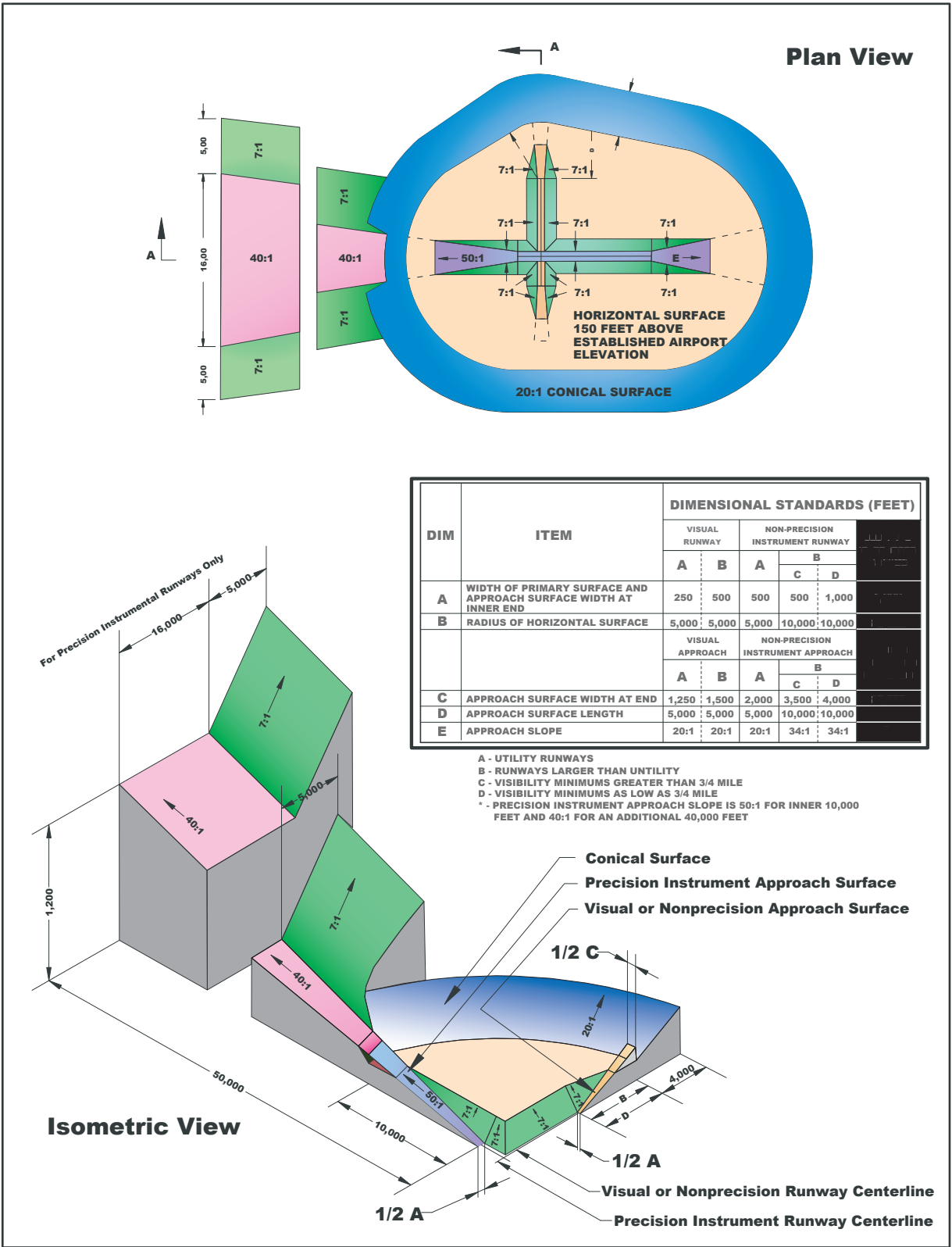
Dimensions of Part 77 vary depending on the type of runway approach, precision, non-precision, or visual. **Exhibit 7-11** provides a visual representation and general information on Part 77 surfaces.

Although the FAA can determine which structures are obstructions to air navigation, the FAA is not authorized to regulate tall structures. State and local authorities have control over the areas within the Part 77 surfaces for each airport. As a result, it is important for airports to first identify their specific Part 77 surfaces and then to work with local municipalities to enact appropriate land use controls or zoning to limit the height of objects within Part 77.

As shown in Exhibit 7-12, all Level I airports have taken steps to identify their Part 77 surfaces. As noted in this same exhibit, 75 percent of the Level II airports have also identified their Part 77 surfaces. Systemwide, this results in an 88 percent compliance rating for this compatibility-related benchmark. While most System airports have taken steps to identify their Part 77 surfaces, most RASP airports are unclear on what steps have been taken by surrounding municipalities to actually to control development and land use within each Part 77.

*Benchmark: Percent of System airports included in local comprehensive plan or vision statement.*

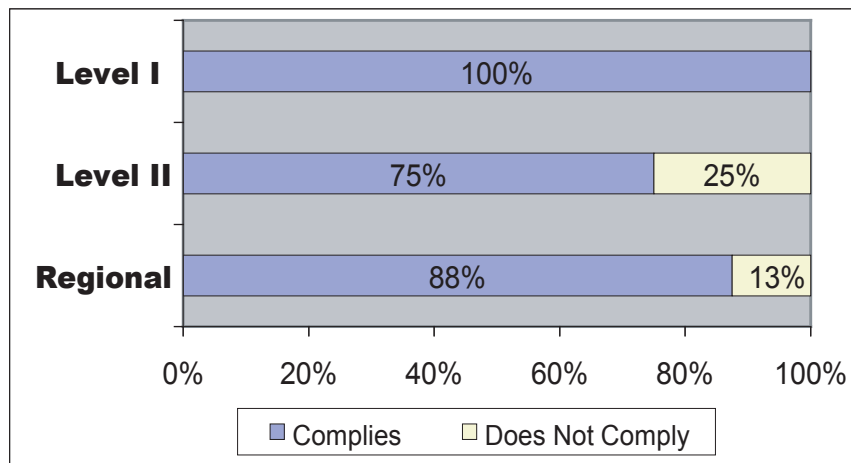
For airports in the Regional Aviation System to be protected and expanded as needed, it is important that they be included and recognized in locally based comprehensive planning efforts. Comprehensive plans set the framework for land use planning, development, and transportation infrastructure.



# FAR PART 77 SURFACES

Exhibit 7-11

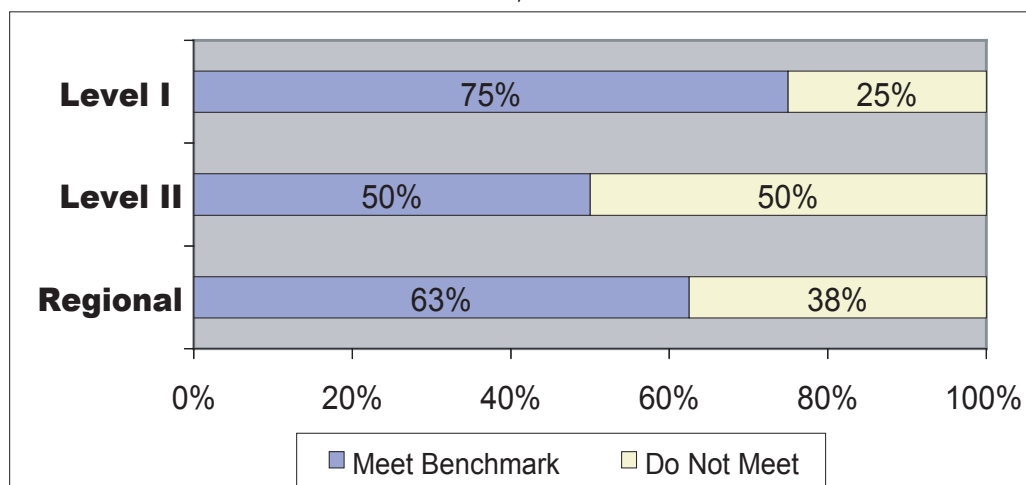
**Exhibit 7-12**  
**FAR PART 77 BENCHMARK**



While the airport master plan provides the actual blueprint for on-airport development, local comprehensive plans, unless they specifically include and address the airport, can impede or even prevent airport expansion that may be recommended in the master plan. Gathering the information needed to analyze this benchmark shows that, in many instances, there is a distinct disconnect between the airports and their surrounding municipalities. This conclusion is based on the fact that several airports in the System are unaware as to whether or not a local comprehensive plan exists and are further uncertain as to whether their airport is recognized or included, assuming that such a plan exists.

As shown in **Exhibit 7-13**, 75 percent of the Level I airports now report that they are included in a local comprehensive plan or vision statement, while 50 percent of the Level II airports report that they are part of such a locally based planning document. For the System as a whole, this results in a compliance rate of 63 percent for this particular benchmark.

**Exhibit 7-13**  
**AIRPORTS IN COMPREHENSIVE PLANS/VISION STATEMENT BENCHMARK**



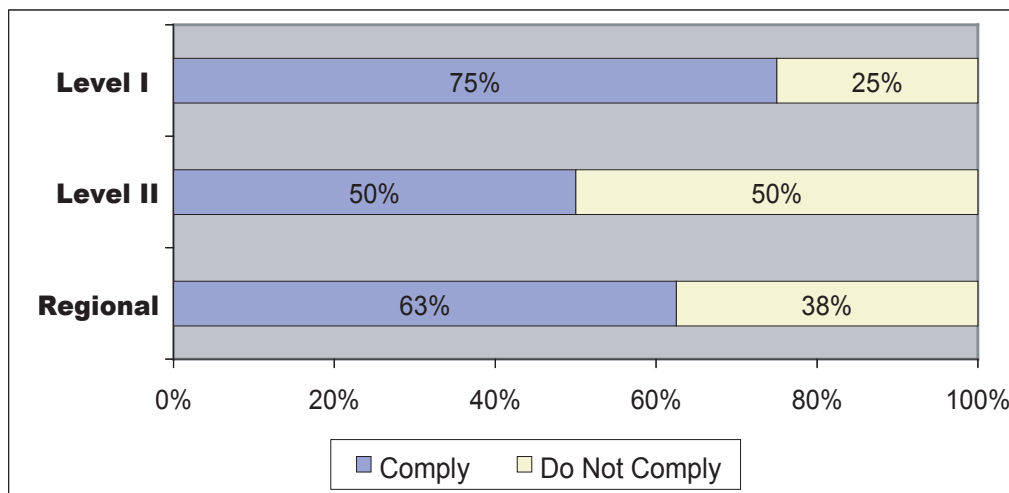
*Benchmark: Percent of System airports with a current master plan or airport layout plan (ALP).*

One of the best ways for an active airport to ensure that it can respond to near- and longer-term development needs in a way that is most compatible with both the human and the natural environment is to have regular updates to its master plan. For Federally eligible airports, the FAA and ADOT participate in the funding of an airport master plan.

Airport master plans should be updated as growing demand warrants, as changing conditions at the airport or in the community precipitate, or as changes in FAA planning and design standards dictate. For the RASP, ALPs and master plans were considered current for System airports if they had been prepared within the past five years. In reality, at low-activity airports, updates on a less frequent basis may be acceptable.

As shown in **Exhibit 7-14**, 75 percent of the Level I airports have master plans that have been prepared in the past five years. Pinal Airpark is the only Level I airport that does not have a recent master plan; its last master plan was reportedly prepared more than 10 years ago in 1991. According to information provided by System airports during the RASP inventory effort, 50 percent of the Level II airports have current (past five years) airport master plans. Sells and La Cholla Airpark do not have current master plans. Since neither of these are currently Federally eligible airports, this accounts for the fact that these airports do not have current planning documents. Exhibit 7-14 indicates that, for the System as a whole, 63 percent of the Study airports have current master plans.

**Exhibit 7-14**  
**MASTER PLAN/ALP BENCHMARK**



*Benchmark: Percent of System airports with current noise contour.*

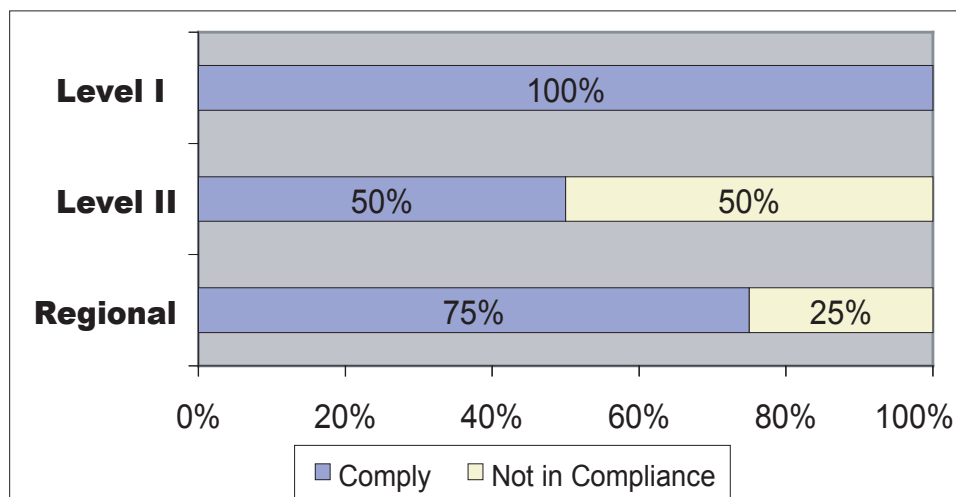
As with Part 77 surfaces, noise contours can help airports identify those activities and properties beyond airport property that may be subject to adverse impacts from airport operations. The FAA uses the integrated noise model (INM) to develop contours that represent decibels of cumulative noise exposure

from aircraft operations. The INM uses aircraft flight tracks, aircraft fleet and engine mix, and the hours in which the operations occur to measure noise impacts. Generally speaking, when noise from aircraft operations exceeds 65 dnl, activities that are noise-sensitive in nature should be discouraged from these areas. Current noise contours are an important and effective tool for planning for and promoting compatibility in the airport environs. Without a noise contour, airports lack important information for determining those areas, off-airport property, that may be impacted.

For this particular benchmark, it is worth noting that, for lower activity level airports where the operating fleet is limited to turbine and piston driven small general aviation aircraft, INM noise contours seldom extend but a few hundred feet beyond the end of the runway. Consequently, it is not as important for Level II airports in the PAG RASP System to have up-to-date noise contours because their noise contours are usually confined to airport property.

**Exhibit 7-15** provides information on those System airports reporting they have current (past five years) noise contours. As shown in this exhibit, all Level I airports reported, as part of the RASP inventory, that they have current noise contours. Among the Level II airports, 50 percent report that they have current noise contours. As with the master plan/ALP benchmark, Sells and La Cholla Airpark are the two Level II airports that reportedly do not have current noise contours. La Cholla Airpark did, however, have a noise contour prepared at the time of the last RASP (1994). Systemwide, 75 percent of the Study airports report that they have current noise contours.

#### **Exhibit 7-15 NOISE CONTOUR BENCHMARK**



*Benchmark: Percent of System airports following ADOT guidelines for airport influence area map and real estate disclosure.*

The Arizona legislature enacted A.R.S. § 28-8486 in 1999. This Act defines “the territory in the vicinity of a public airport” as all property within the “traffic pattern airspace” (as defined by the F.A.A.). This

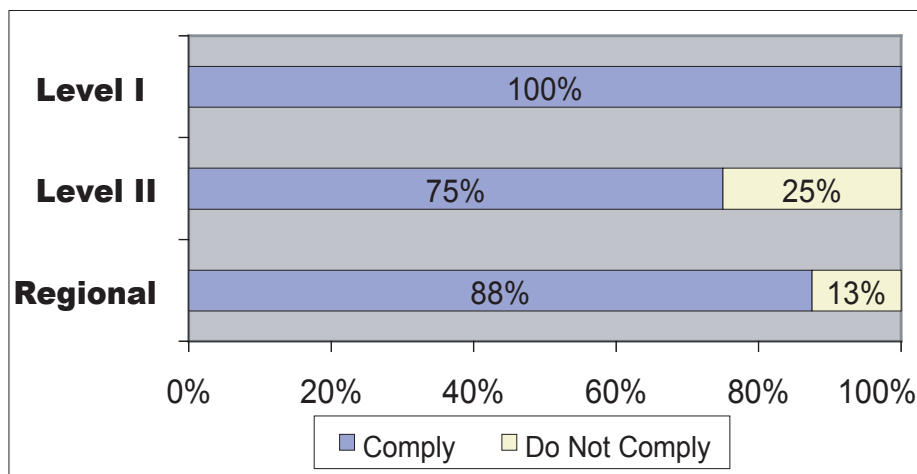
“territory” also includes property that experiences a day-night average sound level of 60 decibels or higher (for Pima County airports; 65 decibels for Pinal and Cochise County airports).

This Arizona statute also requires the Department of Real Estate to have and to make available to the public, on request, a map showing the exterior boundaries that fall within this area around each public airport. These boundaries, according to Arizona statutes, are to be clearly defined on a street map. The statute directs the Department of Transportation to work with each of the public airports in the State system to create a map that is visually useful in determining whether property in the airport environs lies within the described area.

ADOT defines these items as an airport influence area (AIA) and airport disclosure map. Airport owners are required to prepare these items and file them with their respective County Recorder; a public hearing is required. Property notifications must state that the area is subject to aircraft noise and over flight. ADOT further suggests that the AIA be part of the ALP and any airport-related land use or noise plan. Airports should, at a minimum, attempt to ensure that the AIA and the disclosure information are included in local planning and zoning; the information should also be published in the General Plan and attempts should be made to have the local governing body approve the plan.

According to information obtained from ADOT and collected as part of the RASP inventory effort, all Level I airports meet this benchmark. As shown in **Exhibit 7-16**, 75 percent of the Level II airports in the System also meet this benchmark. The only System airport that does not currently meet this benchmark is Sells. Airport-specific information on AIAs and airport disclosure maps can be found at <http://www.re.state.az.us/airports/airportintro.html>.

**Exhibit 7-16**  
**ADOT AIRPORT INFLUENCE AREA MAP BENCHMARK**



## Summary for Compatibility Performance Measure

A number of benchmarks have been used to determine how well the PAG RASP System is currently meeting the Compatibility performance measure. This review shows that, in general, most System airports have taken steps to make them more compatible with their surrounding environs. All Level I airports and 75 percent of the Level II airports have taken steps to identify their Part 77 surfaces. Follow-on steps are needed, however, to relate to the adoption of height zoning based on FAR Part 77 guidelines.

Analysis completed for this performance measure shows that 75 percent of the Level I airports and 50 percent of the Level II airports are recognized in their local comprehensive plans. Similar percentages of the airports in the PAG RASP System report they have current master plans or ALPs, while 100 percent of the Level I and 50 percent of the Level II airports report they have current noise contours. From review of available information, the RASP has concluded that 88 percent of all System airports have taken steps to make themselves compliant with ADOT guidelines for preparing an AIA and Disclosure Map.

## Performance Measure: Financial Responsibility

Another characteristic of a good airport system is that it should be financially responsible. In an attempt to operate profitably, most larger general aviation and all commercial service airports typically have systems that track revenue and expenses. It is not uncommon, however, to find smaller general aviation airports that lack appropriate financial planning and tracking tools.

For the PAG RASP System to remain financially stable over the next 30 years, it is appropriate for System airports to take certain steps to make themselves financially responsible. Benchmarks used for this performance measure are indicative of the actions System airports have taken to make themselves financially responsible. These actions increase the longevity of System airports and maximize the historic local, State, and Federal investment that has taken place.

Benchmarks used to evaluate the Financial Responsibility performance measure are as follows:

- Percent of System airports with full-time, on-site staff.
- Percent of Region within 30-minute drive time of a privately owned System airport.
- Percent of System airports with completed business/financial plans.
- Percent of System airports with local sponsor contribution.
- Percent of System airports that have recently updated their rates and charges.
- Percent of System airports with a recent land appraisal.
- Percent of System airports with published minimum standards/operating procedures.

Results of the System evaluation for these financial-related benchmarks are discussed in the following sections of this chapter.



*Benchmark: Percent of System airports that have full-time, on-site staff.*

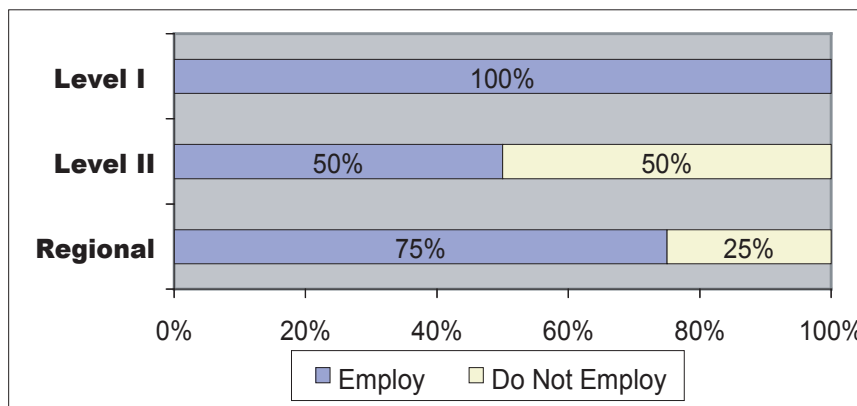
Most larger and active airports typically have on-site staff members who are dedicated to the operation and maintenance of the airport on a full-time basis. These staff members are usually employees of the municipality or the authority that owns and operates that airport. On the other hand, it is not uncommon to find smaller general aviation airports that have part-time staff members who are not dedicated full-time to the airport; these staff members often have other municipal responsibilities in addition to the airport.

It is worth noting that the lack of full-time, on-site staff is not necessarily indicative of an airport that is not financially responsible. Smaller, less active general aviation airports may not warrant full-time, on-site staff, nor may they be able to support dedicated, full-time staff. Nevertheless, this benchmark helps to provide some insight into the overall financial situation at each System airport.

This is an informational benchmark. Data collected as part of the RASP show that airports presently without full-time staff are all Level II airports. In fact, Ajo Municipal is the only Level II airport that presently reports full-time, on-site staff. Sells, Benson Municipal, and La Cholla Airpark all have dedicated staff, but they are not full-time, on-site employees. Information provided by Benson Municipal as part of the RASP indicates that this airport is expected to have full-time, on-site staff soon. Consequently, this Level II airport was reported as meeting this benchmark.

**Exhibit 7-17** reflects the System's ability to meet this benchmark. As shown, all Level I airports currently have full-time, on-site staff, while 50 percent of the Level II airports meet this benchmark. This rating for the Level II airports assumes that Benson Municipal meets this particular benchmark. The systemwide compliance rating for this benchmark is 75 percent.

**Exhibit 7-17**  
**AIRPORTS EMPLOYING FULL-TIME STAFF BENCHMARK**



*Benchmark: Percent of Region within 30 minutes of a privately owned airport.*

In some systems, the long-term availability of privately owned airports can be questionable. Because they are not obligated to remain open (as are publicly owned, Federally funded airports), private airports can

close. In some systems where pressure from developers is intense, privately owned airports have been sold and converted to non-aviation uses.

Within the System of airports included in the PAG RASP, there is only one privately owned airport, La Cholla Airpark. This privately owned airport, however, is different than most. La Cholla Airpark is a residential airport with individual property owners owning the homes that have access to the airpark's runway. Because of the unique nature of its association ownership, there is little likelihood that this privately owned airport will close. Private airport ownership is not an issue for the RASP System.

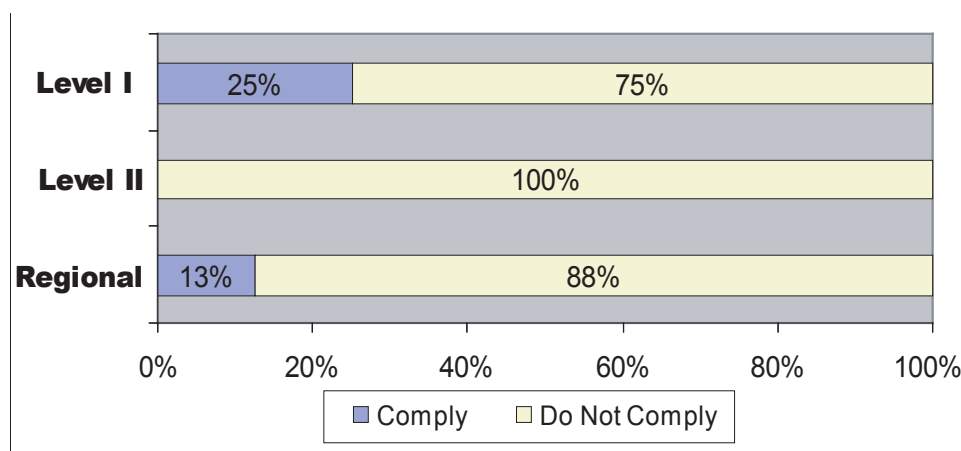
La Cholla Airpark is important in the Regional Aviation System by virtue of its location and number of based aircraft. According to GIS analysis, an estimated 17 percent of the Study Area's population and 11 percent of its employment are within a 30-minute drive time of La Cholla Airpark. It is worth noting that the 30-minute service area for La Cholla Airpark has some overlap with the 30-minute service areas for Marana Northwest Regional and Pinal Airpark. Within the PAG System, both of these airports have been designated as Level I airports, while La Cholla Airpark has been designated as a Level II airport.

*Benchmark: Percent of System airports with a completed business/financial plan.*

As shown in **Exhibit 7-18**, only one System airport, Tucson International, reports that it has a business/financial plan. As indicated in Exhibit 7-18, at a rating of only 13 percent, it is the lowest compliance rating for the System for all performance measures and benchmarks. This is an informational benchmark that speaks to the degree of activity that may be required for an airport to undertake financial planning on its own.

#### **Exhibit 7-18**

#### **AIRPORTS WITH BUSINESS OR FINANCIAL PLAN BENCHMARK**



Despite their size, it is possible and often practical for smaller, less active general aviation airports to have financial and/or business plans. A possible explanation as to why more of the System airports do not have these plans may relate to the fact that such plans, unless incorporated into a master plan or other

airport-specific planning study, may not be eligible for funding by the FAA. Three states, including New York, Maine, and Rhode Island, have seen the benefit of providing their System airports with this type of resource and have started to provide financial/business plans for their general aviation airports as part of more comprehensive statewide system planning efforts or individual airport master plans.

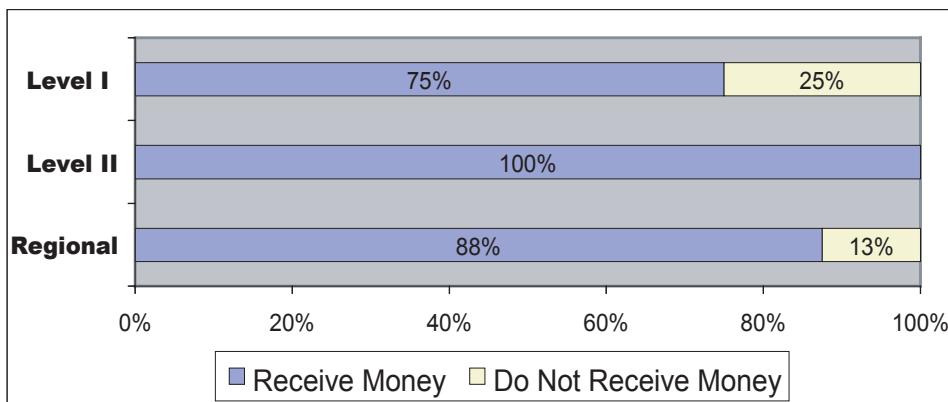
*Benchmark: Percent of System airports whose local operator/owner contributes to its operation and development.*

One means of measuring the financial responsibility of an airport system is to determine the number of owners/operators that are contributing to the operation, maintenance, and development of their respective facilities. While ADOT and FAA grants are available to eligible airports for their capital projects and equipment purchases, these grants do not typically address operating and maintenance needs.

As shown in **Exhibit 7-19**, the System receives high marks for this benchmark. According to information supplied by System airports as part of the PAG RASP, 88 percent of all System airports receive financial support from their owners/operators. Reportedly, only Pinal Airpark, a Level I airport, does not receive local financial support. According to information gathered as part of the RASP, this airport is operated by a third party rather than by the public owner of the airport.

As shown in Exhibit 7-19, aside from Pinal Airpark, all other Level I and Level II airports in the System report that they receive local financial support.

**Exhibit 7-19**  
**LOCAL PUBLIC OWNER CONTRIBUTION BENCHMARK**

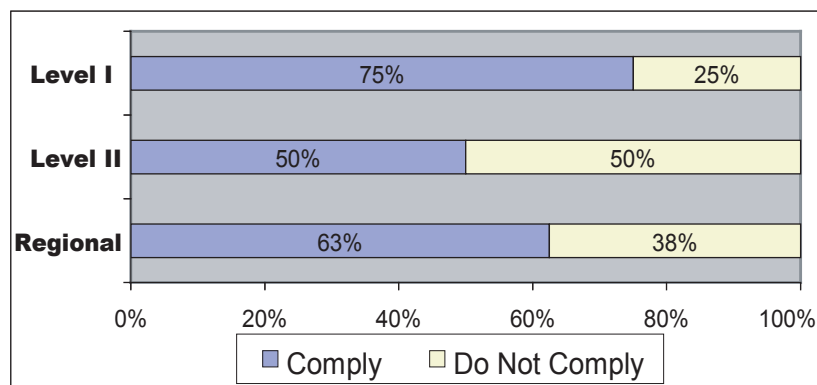


*Benchmark: Percent of System airports that have recently updated their rates and charges.*

**Exhibit 7-20** reflects the findings for this particular benchmark. As shown, 75 percent of the Level I airports indicated they have recently updated their rates and charges. Pinal Airpark is the only Level I airport not indicating a recent update. Among the Level II airports, 50 percent indicated a recent update to their rates and charges. It is worth noting that this percentage includes Benson Municipal, a new airport to the System, so an update of its rates and charges at this time is not necessary.

Airports should review their rates and charges on a regular basis. It is important for all airports to maximize their revenue streams, and one of the best ways they can accomplish this is by having rates and charges that appropriately compensate the airport owner for the use of their facilities. It is also important that, when airports develop their leases, they be written in such a way as to permit regular review and update.

**Exhibit 7-20**  
**RATES AND CHARGES BENCHMARK**



As with other facets of airport financial management, regular updates may be beyond the reach of smaller System airports. The American Airport and Airline Executives (AAAE) publish, on an annual basis, information that shows typical rates and charges for member airports. At a minimum, System airports can use these rates and charges as a guide for internal review of their own rates and charges.

*Benchmark: Percent of System airports that have had a recent appraisal of the value of their land/property.*

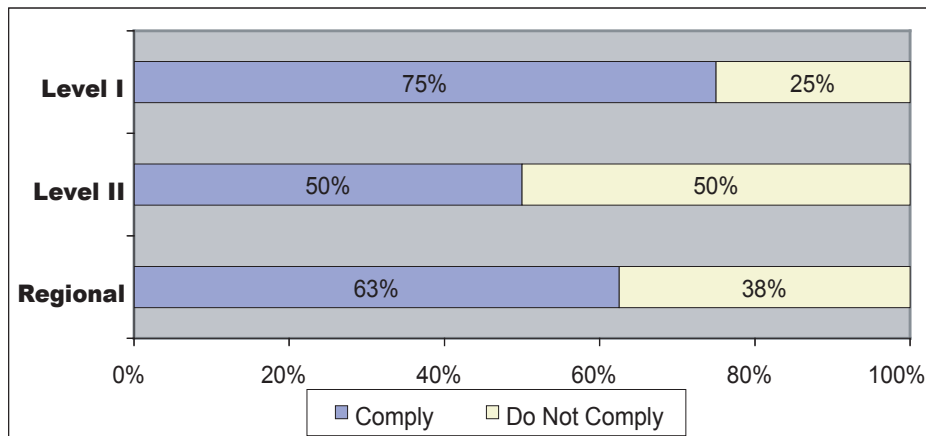
In an effort to attract tenants and development, some airports undervalue their land leases. In some settings where there are surplus development opportunities, this type of approach may be necessary to attract tenants. In any scenario, however, airports should attempt to receive fair market value for the lease or sale of their property. The best way for an airport to know if they are receiving fair compensation for the use or sale of their property is through a professional appraisal of that property.

As shown in **Exhibit 7-21**, 63 percent of the System airports have reportedly had a recent land appraisal. As with the preparation of a business or financial plan, a land appraisal is an item that the airport may fund themselves, unless it is accomplished as part of a master plan. The RASP determined that 75 percent of all Level I airports have had a recent land appraisal. Pinal Airpark is the only Level I airport that reported it had not had a recent appraisal. For the Level II airports, Ajo Municipal and Benson Municipal reported that they had a recent appraisal of its land values.

*Benchmark: Percent of System airports with published operating standards or minimums.*

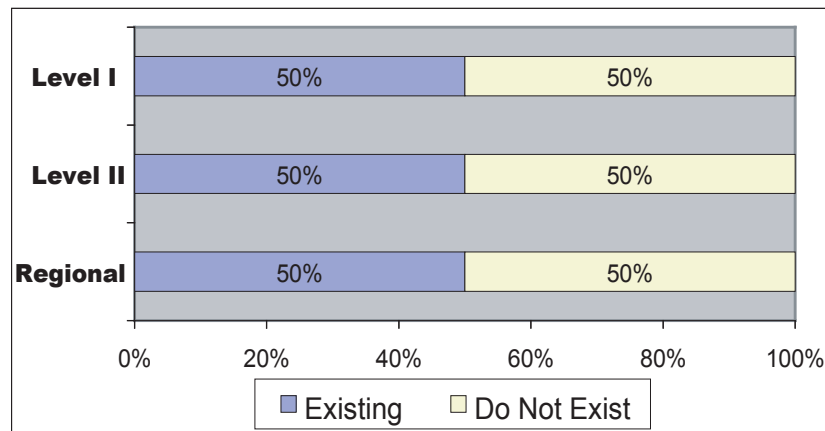
As with a financial or business plan, it is good practice for most airports to have published minimum standards and/or operating procedures. These standards and procedures can help airports ensure that they are operating efficiently from a financial standpoint. Minimum standards help airports develop in a cohesive, efficient, and uniform manner. These types of guidelines also help airports make sure they obtain the services and performance they expect from their tenants and on-airport businesses.

**Exhibit 7-21**  
**LAND APPRAISAL BENCHMARK**



**Exhibit 7-22** indicates that 50 percent of all System airports have minimum operating standards. Within Level I, both Ryan Airfield and Tucson International have minimum standards, while among Level II airports, both La Cholla Airpark and Ajo Municipal have such standards. As with most benchmarks for the Financial Responsibility performance measure, the ability of System airports to meet this benchmark helps to ensure that System airports are performing in the most financially responsible manner.

**Exhibit 7-22**  
**MINIMUM STANDARDS &  
OPERATING PROCEDURES BENCHMARK**



## Summary for Financial Responsibility Performance Measure

Benchmarks examined in this phase of the System evaluation are primarily informational in nature. These benchmarks help to provide a general overview of how well the Regional Aviation System is currently performing from a financial standpoint. It is important to note that the System's current lack of compliance with one or more of the benchmarks used for this performance measure does not necessarily imply that the System is not financially responsible.

Since airports usually are not able to obtain Federal or State funds to provide the products needed to comply with the benchmarks used in this phase of the analysis, it is not surprising that the compliance ratings for these particular benchmarks lag behind the rating for benchmarks used to evaluate other performance measures. As with some of the benchmarks used to evaluate the Compatibility performance measure, the findings of this phase of the System evaluation show that there is room for System improvement, in the event that resources are available to help System airports to more fully comply with these benchmarks.

## Performance Measure: Accessibility

Perhaps one of the most important characteristics of a good airport system is the system should be accessible. Airports should be accessible from both the air and the ground. Benchmarks were, therefore, identified to measure both accessibility factors.

FAA guidelines indicate NPIAS airports should be within a 30-minute drive time of their intended users. Therefore, this was the standard used to evaluate the accessibility of System airports. GIS mapping was used in this phase of the analysis to evaluate several of the accessibility benchmarks.

Benchmarks used to evaluate the accessibility of the RASP System are as follows:

- Percent of Region within 30 minutes of a System airport capable of accommodating needs of business aircraft (5,000-foot runway).
- Percent of Region within 30-minute drive time of any System airport.
- Percent of Region within 30-minute drive time of a System airport with a precision approach.
- Percent of Region within 30-minute drive time of a System airport with a non-precision approach.
- Percent of Region within 30 minutes of a System airport accommodating special-use aviation.
- Percent of System airports served by public transportation.
- Percent of System airports with intermodal transfer capabilities.

The results of the analysis conducted to determine how well the RASP System is currently performing in terms of its ability to meet the Accessibility performance measure follow.

*Benchmark: Percent of Region within a 30-minute drive time that can meet the needs of business category general aviation aircraft (5,000-foot runway).*

Generally, for an airport to fully accommodate the needs of a full range of business category general aviation aircraft, the airport needs to have a minimum runway length of 5,000 feet. This runway length is generally considered to be needed to adequately meet the needs of most general aviation business jets.

Within the Regional Aviation System, there are five System airports whose primary runway has a length of at least 5,000 feet. All Level I airports, Tucson International, Ryan Airfield, Marana Northwest Regional, and Pinal Airpark, have runway lengths of at least 5,000 feet. One Level II airport, Sells, also has a runway length that exceeds 5,000 feet.

Using GIS analysis, 58 percent of the Region's population and over 73 percent of its employment are within a 30-minute drive time of a System airport that has a minimum runway length of 5,000 feet.

*Benchmark: Percent of Region within 30 minutes of any System airport.*

As noted, the FAA generally recommends that System airports be within a 30-minute drive time of their intended users. GIS analysis shows that, when all eight System airports are considered, 89 percent of the Pima County population and 91 percent of its employment are within a 30-minute drive time of one, or in some cases more, System airports.

*Benchmark: Percent of Region within a 30-minute drive time of an airport with either a precision or non-precision approach.*

Within the RASP System, only two airports have precision approaches. These two airports are Tucson International and Ryan Airfield. There are no airports in the System that currently have a non-precision approach. All other airports in the System, aside from Tucson International and Ryan Airfield, have only visual approaches.

GIS analysis shows that, based on the two System airports that have precision approaches, 50 percent of the Region's population and 70 percent of its employment are within a 30-minute drive time of a System airport with a precision approach. There are no System airports with non-precision approaches; therefore, there is no coverage for this benchmark.

*Benchmark: Percent of Region within a 30-minute drive time of a System airport accommodating "special-use" aviation activities.*

While the focus of the Accessibility performance measure is on ensuring that the System is meeting the more conventional aviation needs of resident, visitor, and business users of the System, it is also important for the System to meet the needs of sport aviation users. According to information collected during the RASP inventory, Benson Municipal and Marana Northwest Regional reported that they accommodate special-use aviation activities by serving ultralight and experimental aircraft.

Based on this information, this translates into 8 percent of the Region’s population and 3 percent of its employment being within a 30-minute drive time of a System airport that accommodates special-use aviation activities.

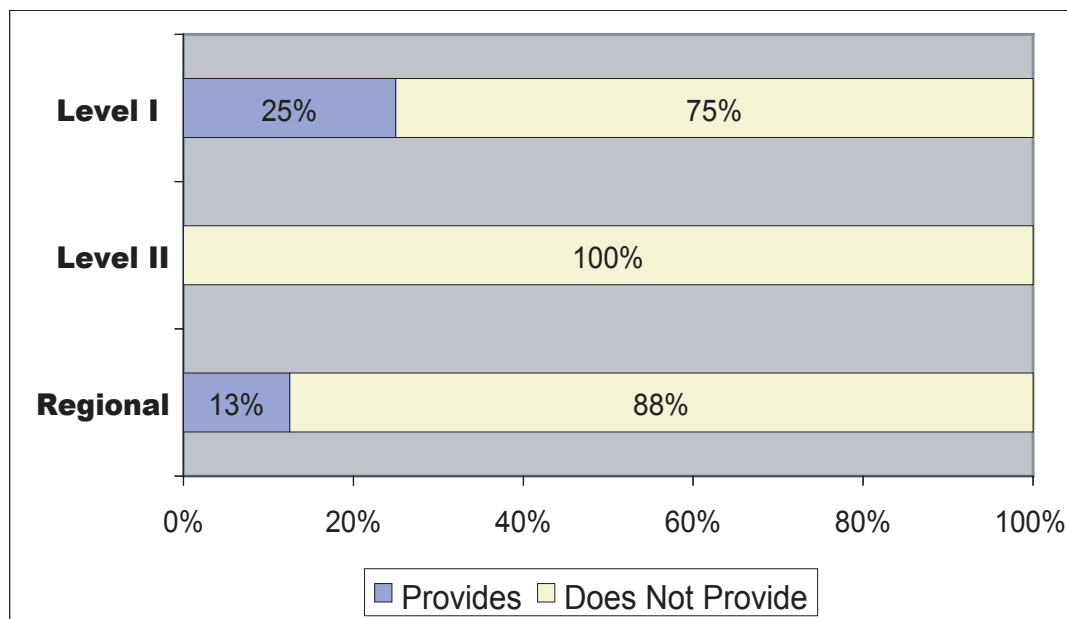
When compared to other benchmarks used to evaluate the Accessibility performance measure, this benchmark has a relatively low coverage rating. It is important to note that there are other privately owned restricted-use airports in the Study Area that also meet the needs of special-use aviation in the Region. As options for improving and enhancing the System are explored in the next phase of the RASP, the role that these privately owned, private-use airports play in meeting the Region’s special-use aviation needs will be determined.

*Benchmark: Percent of airports in the System served by public transportation or that have intermodal transfer capabilities.*

As shown in **Exhibit 7-23**, only one System airport, Tucson International, currently has public transportation and intermodal transfer capabilities. As a result, 25 percent of the Level I airports meet this benchmark, while 75 percent of the Level I airports do not. For the Level II airports, there is currently a zero compliance rating for this benchmark. Systemwide, 13 percent of the airports are now meeting this particular accessibility-related benchmark.

Even though only one of the System airports now meets this benchmark, there is still relatively good System coverage. GIS mapping indicates that 47 percent of the Region’s population and 70 percent of its employers are still within a 30-minute drive time of a System airport with public transportation and intermodal transfer capabilities.

**Exhibit 7-23**  
**PUBLIC TRANSPORTATION AND INTERMODAL TRANSFER BENCHMARK**





### Summary for Accessibility Performance Measure

The results of the analysis for the Accessibility performance measure can be summarized as follows:

Benchmark	Population Covered	Employment Covered
5,000-foot Runways	8%	73%
All System Airports	89%	91%
Precision Approach	50%	70%
Non-Precision Approach	none	none
Special Use	8%	3%
Public Transportation/ Intermodal Facilities	47%	70%

### System Evaluation Summary

The previous sections of this chapter have provided a review of the existing System's ability to meet each of the established performance measures. This determination has been made by reviewing the System's ability to meet each of the benchmarks identified for each performance measure. **Table 7-6** provides information that shows how each System airport is currently contributing toward satisfying each performance measure and its associated benchmarks. The information in this chapter was used to determine where and how the existing Regional Aviation System should be improved.

Table 7-6

## System Adequacy Summary

Variables	Ajo Municipal	Benson Municipal	La Cholla Airpark	Marana Northwest Regional	Pinal Airpark	Sells	Ryan Airfield	Tucson International
Annual Service Volume (ASV)	175,000	175,000	204,000	230,000	195,000	130,000	355,000	380,000
Covered Storage Spaces	8	0	33	152	3	0	179	266
Hangar Waiting List	7	20	37	160	25	No	No	No
Based Aircraft	5	5	92	218	58	0	256	320
Auto Parking Spaces	20	10	10	90	100	5	236	427
Standards								
ARC	B-I	B-I	B-I	C-II	D-III	B-I	B-II	D-V
RSA (end of runway (ft.) x width off centerline)	240 x 120	600 x 150	N/A	1000 x 500	1,000 x 500	60 x 100	300 x 300	1,000 x 500
Runway / Taxiway Separation	N/A	N/A	N/A	400	525 (partial)	N/A	300	537.5
PCI	98	100	Unknown	100	Unknown	Unknown	100	Yes
Airspace	Yes	No	No	No	No	No	No	Yes
Obstructions	No	No	Yes	Yes	No	No	No	No
<b>Economic</b>								
Seats to Top 10 O & D								34,627
Weekly Seat (Domestic)								55,029
Weekly Seat (International)								1,158
One-Way Fare								\$141.64
Part 135 Operator	No	No	No	Yes	No	No	No	Yes
Air Cargo Activity	No	No	No	No	No	No	No	Yes
<b>Compatibility</b>								
Height Zoning ( FAR Part 77)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Local Comp. Plan/Vision Statement	Yes	Yes	No	Yes	No	No	Yes	Yes
Current Master Plan	1999	1997	No	1999	1991	No	1999	1996
Current ALP	1999	2000	No	1999	1991	No	2000	2000
Noise Contour	Yes	Yes	No	Yes	Yes	No	Yes	Yes
ADOT Airport Influence Map & Disclosure	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
<b>Financial</b>								
Full-time/On-site Staff	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Business/Financial Plan	No	No	No	No	No	No	No	Yes
Owner Contribution	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Updated Rates and Charges	Yes	No	Yes	Yes	No	No	Yes	Yes
Recent Land Appraisal	Yes	Yes	No	Yes	No	No	Yes	Yes
Minimum Operation Standards	Yes	No	Yes	No	No	No	Yes	Yes
Provides Public Transportation	No	No	No	No	No	No	No	Yes
<b>Accessibility</b>								
% of region within 30 minutes of a privately-owned airport.			Population = 17% Employment = 11%					
Within 30 minutes throughout the System			System Population	System Employment				
Has 5,000-Foot Runway			58%	73%				
Has Precision Approach			50%	70%				
Has Special-Use Aviation			8%	3%				
Has Public Transportation			47%	70%				